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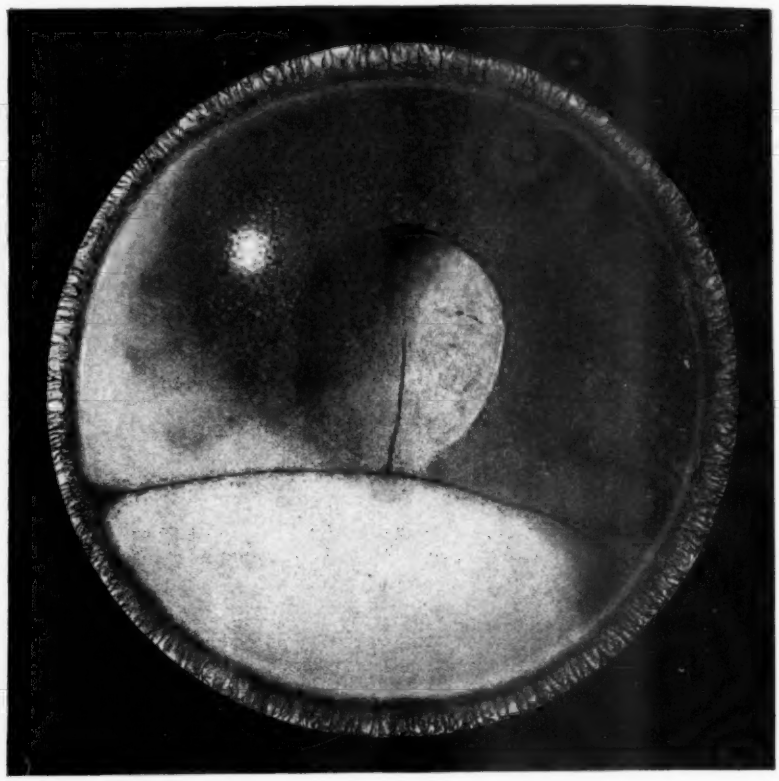

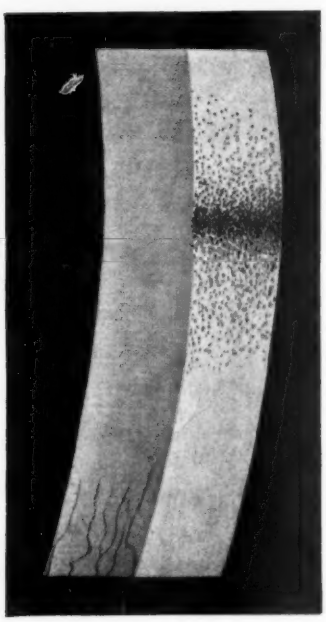

AMERICAN JOURNAL OF OPHTHALMOLOGY

VOLUME 27 APRIL, 1944 NUMBER 4

A NEW TYPE OF PIGMENT LINE IN THE CORNEA*

FREDERICK W. STOCKER, M.D., AND RONALD E. PRINDLE, M.D.
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Many instances of unusual pigmentation of the cornea were observed and described before the slitlamp and the binocular microscope were developed. However, a more accurate knowledge of the conditions in which pigmentation of the cornea might occur and the layers in which the pigment might be deposited was not obtained until careful studies had been carried out with these instruments.

The following types of corneal pigment lines have been described.

1. Fleischer's ring in keratoconus.
2. Senile corneal line (Staehli).
3. Pigment line in pterygium (Stocker).
4. Pigment line in corneal scars; for example, interstitial keratitis (Hudson, Vogt, Hanssen, and others).
5. Kayser-Fleischer ring: pseudosclerosis (Wilson's disease).
6. Krukenberg's spindle.

The first three types present fine pigment lines that have been shown to be located in the very superficial layers of the cornea immediately beneath the epithelium. Vogt[1] and Grueninger[2] have demonstrated that breaks in Bowman's membrane must be considered the site in which the pigment in a senile corneal pigment line is deposited. Stocker's[3] findings in some cases of pterygium support this theory. These breaks seem to develop when a marked flattening of the cornea occurs, producing astigmatism against the rule, as in old age, keratoconus, and some cases of pterygium.

The fourth type of pigmentation, pigmentation in corneal scars, is not well defined as to its location in the corneal tissue. Often it does not form a distinct line but stains the cornea more diffusely and never has been described as extending from one limbus to the other. Hansen[4] examined microscopically an eye with a corneal scar which *in vivo* had shown pigmentation in its central parts. He found the pigment to be located partly between the epithelial cells, but most of it was deposited between the epithelium and Bowman's membrane, within that membrane, and in the corneal stroma. It never was seen to be located intracellularly.

The Kayser-Fleischer ring in pseudosclerosis is entirely different in appearance from these fine lines. It is much broader, of a yellow reddish color, and the pigment is deposited on Descemet's membrane.

In Krukenberg's spindle and some re-

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Figs. 1 and 2 (Stocker and Prindle). Pigment line in the cornea. Fig. 1. Pigment line across cornea from the 7- to the 5-o'clock position.
Fig. 2. Slitlamp view of pigment line.

lated cases, as described by Weinkauff,[5] the pigment also is located on Descemet's membrane.

Epithelial melanosis of the cornea as described in nevi of the limbus and in malignant tumors growing from the conjunctiva into the cornea, is excluded from consideration in this paper. Vogt,[6] in his slitlamp Atlas, states that in some cases of nevi of the conjunctiva the pigment may invade the adjacent epithelium.

Concerning the nature of the pigment found in the various types of corneal pigment lines, the following observations have been reported: Fleischer[7] proved that the pigment line in keratoconus is hemosiderin. It is probable that the pigment in the other three of the first four types hereinbefore mentioned is also of hematogenous origin. In his case of pigmentation of a corneal scar Hansen[4] could exclude hemosiderin, but he had no positive suggestion as to the nature of the pigment. The pigment in the Kayser-Fleischer ring in pseudosclerosis is of an entirely different nature. According to Vogt[8] finely dispersed silver seems to be present in most of the cases. Others have reported the presence of copper, zinc, and other heavy metals. In Krukenberg's spindle the pigment is believed to originate from the uveal pigment.

Pigment lines of the cornea are not only of theoretical interest but sometimes of diagnostic value. Therefore, any observation of a heretofore unknown type of corneal pigmentation should be reported. We have had the opportunity to observe a corneal pigment line that differs in several characteristics from all the previously described types.

Case report

L. F. W., 24 years old, a darkly pigmented Negro, was first seen in the Duke Hospital Eye Clinic in early November of 1941, complaining of a painful left eye. Two weeks previously some "trash" blew into his left eye, which felt irritated for a few hours, but caused no further trouble until four days later when it became red and painful. At about this time he contracted a severe generalized Dermatitis venenata (Rus toxica). He believed that this precipitated his eye trouble. Treatment was with eye drops of an unknown character and various skin lotions.

When first seen his dermatitis had completely cleared but the left eye was causing him considerable discomfort. Vision O.D. was 20/30; O.S., light perception. The right eye was essentially normal. In the left eye there was a diffuse hyperemia of the conjunctiva with a rather marked circumcorneal flare. There was extensive brownish pigmentation of the limbus and adjacent conjunctiva. The corneal transparency was slightly decreased. The anterior chamber was deep, the pupil irregular, semidilated, and fixed. The fundus could not be visualized. The tension was slightly elevated. Slitlamp examination revealed an intact epithelium and normal corneal stroma. There were many deposits on the posterior surface of the cornea, a prominent aqueous flare with numerous cells, and extensive adhesions between the iris and lens.

The family history, past history, and systemic review were noncontributory. Venereal diseases were denied and blood tests were reported as negative by his local physician.

The diagnosis of nonspecific uveitis with secondary glaucoma was made. Hospitalization was advised but had to be postponed for several weeks for financial reasons. He was treated in the meantime with atropine drops and hot compresses.

In December, hospitalization was arranged for a course of hyperpyrexia with

intravenous typhoid "H" antigen. Hot compresses and atropine instillations were continued along with the usual supportive therapy. Physical examination and laboratory workup, including serology and chest X-ray films, were negative. The eye objectively presented little change except for early cataractous changes in the lens. The tension had decreased to normal limits. Subjectively the eye had improved.

The patient was discharged with instructions for instillations of atropine 1 percent, the application of hot compresses, and cod-liver oil to be applied locally and taken orally.

Frequent return visits were impossible because of transportation difficulties. One month later the eye showed much less conjunctival and circumcorneal hyperemia, but there was beginning deep vascularization of the cornea, inferiorly. Keratitic precipitates were still numerous and there was a dense aqueous flare. The pupil was unchanged. The condition of the eye had caused no further symptoms other than marked visual loss. Repeated search for a possible focus of infection was negative. During the following months the inflammation gradually subsided, but the infiltration and vascularization of the cornea progressed, especially from below.

Eight months after the first examination the first appearance of a fine brownish line was noted, extending across the cornea from the limbus at the 7-o'clock position to the opposite limbus at five o'clock (fig. 1, frontispiece). Slightly to the nasal side of the center of this line a delicate branch with the same appearance radiated diagonally upward. Grossly, this transverse pigment line appeared to be a continuation of the limbal pigment onto the cornea. Slitlamp examination (fig. 2, frontispiece) confirmed this and showed the pigment to be located in the very superficial layers of the cornea. Under high magnification this line had a stippled appearance with a definite broad junction with the limbal pigment of the nasal side and a faint threadlike junction with the limbal pigment of the temporal side. There was a rather dense infiltration of the stroma of the lower half of the cornea with very deep vascularization. A faint aqueous flare was still visible but there were no cells. The pupil was slightly eccentric superiorly, oval in shape, and fixed. Tension was normal.

Thirteen months after the original visit the patient returned because of the recurrence of pain in the left eye. Examination was as before but the left eye was now blind. Enucleation with glass ball implantation was performed. Convalescence was uneventful.

The gross and microscopic examination of the enucleated bulbus revealed the following findings:

Gross examination showed a moderately shrunken bulbus. The lower half of the cornea was opaque. A brown pigment line was clearly visible, running horizontally from the nasal to the temporal limbus. Near the center of this line a branch extended upward.

Microscopic examination revealed the sclera to be thickened throughout, particularly on the nasal side of the posterior segment. From this area arose a mass of granulation tissue involving the inner layers of the sclera, the choroid, and the retina. A similar but smaller lesion was present on the temporal side. This tissue consisted largely of round and epithelioid cells with a few giant cells. In some areas there was caseation. The retina, in the regions which were not involved in the described process, was detached except for a narrow margin near the ora serrata. The ciliary body and processes were atrophic. The angle of the anterior chamber was obliterated by adhesions of the

peripheral margin of the iris to the posterior surface of the cornea. The pupillary margin was adherent to the anterior lens capsule. The iris showed considerable round and epithelioid-cell infiltration.

At the limbus, the corneal epithelium appeared thickened. The cells in the basal and medial layers contained considerable brown pigment. The architecture of the corneal epithelium was not markedly disturbed and showed the normal arrangement of a basal layer of cylindrical and cuboidal cells and a superficial layer of flattened cells. In a small area near the center of the cornea, the basal cells contained large brown pigment granules. Small amounts of this pigment were seen in a few of the superficial cells (fig. 3). It had the same appearance as the limbal pigment. It did not react to iron stain. The corneal thickness was about normal. There was an increase in the number of cells and in places round-cell infiltration. A few small blood vessels could be seen in the stroma, but no connection of the pigmentation with the vascularization could be demonstrated.

In accordance with the direction in which the eyeball was sectioned, this pigment area must be identical with the pigment line observed macroscopically. Bowman's membrane was intact throughout. No pigment was found on, in, or beneath this membrane, nor in the stroma.

The pathologic picture was most suggestive of tuberculosis, although no tubercle bacilli were demonstrable.

The pigment which was found in the corneal epithelium was not hemosiderin as in Fleischer's ring, since it did not stain by the Berlin blue method. Most probably it was melanin, since the corneal pigmentation was continuous with the pigment of the limbus.

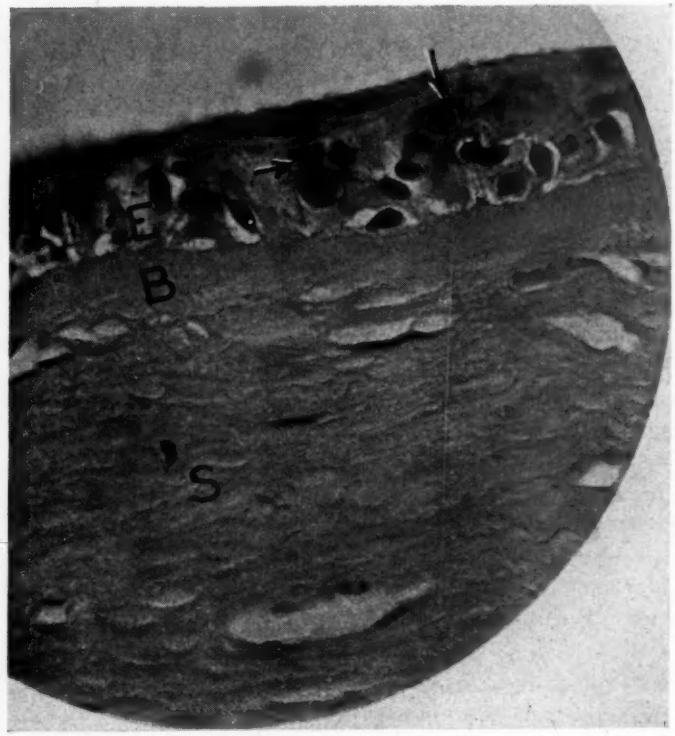

Fig. 3 (Stocker and Prindle). Section through cornea, high magnification. E, epithelium; B, Bowman's membrane; S, stroma. Arrows show pigment located in epithelial cells.

Discussion

How does this melanotic pigment establish itself in the corneal epithelium and why does it form such a very fine line instead of invading the cornea diffusely? It is well known that, in the Negro, inflammation is commonly associated with abundant pigment formation. Therefore, the appearance of pigment in the cornea, which to a certain extent was involved in the extensive inflammatory process of the whole eye, is not surprising. Why the pigment does not invade the cornea diffusely or along the blood vessels is more difficult to explain. The horizontal senile line and the line seen in pterygium could be explained by a flattening of the cornea in one direction, causing a break in Bowman's membrane. Since in our case the pigment was located in the corneal epithelial cells, and Bowman's membrane was intact, this explanation would not apply. As the principal pigment line in our case was located in the palpebral fissure where light had the most access to the cornea, the hypothesis might be advanced that the melanin was formed by the action of irradiation on some premelanotic substance originating from the inflammatory process. Unfortunately, we were not able to test the dopa reaction, which might have thrown some light upon that problem, for we were unable to get the necessary reagents.

Summary

1. A previously undescribed type of corneal pigment line is reported in the eye of a Negro which had been the site of a severe inflammatory process, probably tuberculosis.

2. The pigment has been demonstrated histologically to be located within the corneal epithelial cells. Bowman's membrane was intact throughout and both this membrane and the corneal stroma were free of pigment.

3. The pigment does not take the iron stain and is considered to be melanin.

We are indebted to I. N. Dubin, M.D., of the Department of Pathology, for his technical assistance in the preparation and sectioning of the eyeball.

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AN OPHTHALMOLOGIC REVIEW OF MORE THAN TWENTY THOUSAND MEN AT THE ALTOONA INDUCTION CENTER

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The opportunity to study a group of 21,446 men examined at the Altoona Induction Station, over a period of months, gives a rare picture in the eye findings in young men between the ages of 17 and 44 years, as found in central Pennsylvania. These men were examined in daily order, no attempt being made to select a particular group. Such a record could not be obtained from a study of cases coming into the office, for the patient who makes an appointment with an ophthalmologist usually suspects a need of visual correction, or has some ocular disease. Five thousand of the men between the ages of 17 to 21 were classified separately, in an effort to determine if the younger men had any marked variation in percentage of eye defects. The record does not show this to be so. Consequently, the discussion covers the group as a whole.

The men are from the counties of Blair, Bedford, Clearfield, Centre, Cambria, Sommerset, Indiana, Huntingdon, Mifflin, and Clinton. This area represents an ideal cross section of Pennsylvania, for at least five of the counties contain very few foreign born or children of foreign-born parents, whereas the remainder of Pennsylvania has a high percentage of this stock. Farming, coal-mining, heavy-metal, and other types of industry are about equally divided; only four cities have a population of over 10,000.

In this review only men with 20/40 or less vision were considered, as this was the army standard for acceptable vision. There were many others whose vision ranged from 20/40 to 20/20. In this age group hyperopia is not fairly shown, for the men still have active accommodation. Naturally, only those with high errors of hyperopia have 20/40 or less vision.

Aphakia was not listed, but the eye, if aphakic, was placed under the heading of congenital or traumatic cataract as originally acquired.

Corneal scars were considered only if a loss of vision to 20/40 or less was present.

Refractive errors led in cause of defects, with 16.07 percent. We were unable to find that the family status had any bearing as a causative factor. Diet apparently was not a factor, as rich or poor appeared to be equally affected with myopia, squint, and amblyopia. The children of old American stock seemed to have a higher incidence of myopia as compared to those of foreign parentage. Amblyopia was no respecter of nationality. High hyperopia was found more frequently in the Italian.

We were surprised at the figures for amblyopia without squint, for 2.39 percent were amblyopic and only 0.75 percent of these had squint. Amblyopia in this study is 20/70 or less vision, corrected. We had thought from our office practice and reading that amblyopia is more frequently associated with squint. The findings do not substantiate our idea of this relationship.

Many of the men who had refractive errors, had never had glasses, and an equal number had glasses and would not wear them. This examination definitely shows that a young man, unless willing, does not wear glasses, and apparently no amount of education can change his mind. Men with high errors of refraction frequently had left their spectacles at home or wore them in their pockets. Others had never troubled themselves to obtain

TABLE 1

AN OPHTHALMOLOGIC REVIEW OF TWENTY THOUSAND MEN AT THE ALTOONA INDUCTION CENTER

	Age 17–21 incl. 5,575	Percentage	Age 22–44 incl. 15,871	Percentage	All Ages 21,446	Percentage
Refractive Defects						
Low myopia—20/40 or less	462	8.30	1,059	6.67	1,521	7.09
High myopia—20/200 or less	151	2.71	652	4.11	803	3.74
High hyperopia—20/40 or less	226	4.05	638	4.02	864	4.03
Mixed astigmatism—20/40 or less	22	0.39	29	0.183	51	0.238
Convergent squint with amblyopia	16	0.29	95	0.598	111	0.517
Convergent squint without amblyopia	3	0.054	12	0.076	15	0.070
Convergent alternating squint	4	0.072	15	0.094	19	0.088
Divergent squint with amblyopia	8	0.143	42	0.265	50	0.233
Divergent squint without amblyopia	2	0.036	9	0.057	11	0.051
Divergent alternating squint			1	0.006	1	0.005
TOTAL					3,446	16.07
Congenital Defects						
Albinism			2	0.013	2	0.009
Amblyopia, 20/70 or less	102	1.83	412	2.59	514	2.39
Bilateral chorioretinitis			1	0.006	1	0.005
Buphthalmos	1	0.018	1	0.006	2	0.009
Cataract	3	0.054	28	0.176	31	0.144
Coloboma of iris			2	0.013	2	0.009
Cyst of sclera			1	0.006	1	0.005
Microphthalmos			1	0.006	1	0.005
Nystagmus	7	0.126	36	0.227	43	0.201
Optic atrophy			2	0.013	2	0.009
Persistent tunica vasculosa lentis			2	0.013	2	0.009
Ptosis	2	0.036	6	0.038	8	0.037
TOTAL					609	2.84
Traumatic Injuries						
Cataract	12	0.215	102	0.643	114	0.532
Chorioretinitis	5	0.090	28	0.176	33	0.154
Corneal scar	4	0.072	61	0.384	65	0.303
Ectropion			1	0.006	1	0.005
Enucleation	3	0.054	41	0.258	44	0.205
Intraocular foreign bodies	1	0.018	1	0.006	2	0.009
Iridodialysis	1	0.018	8	0.05	9	0.042
Luxated lens			1	0.006	1	0.005
Optic atrophy	6	0.108	21	0.132	27	0.126
Paralysis of external rectus	1	0.018			1	0.005
Phthisis bulbi	2	0.036	21	0.132	23	0.107
TOTAL					320	1.49
Ocular Diseases						
Blepharitis	7	0.126	5	0.032	12	0.056
Chalazion	1	0.018	2	0.013	3	0.014
Chorioretinitis	21	0.38	66	0.416	87	0.406
Complicated cataract	6	0.107	7	0.044	13	0.061
Congestive secondary glaucoma	1	0.018	3	0.019	4	0.018
Conjunctivitis	3	0.054	1	0.006	4	0.018
Detachment of retina	2	0.036	11	0.069	13	0.061
Diabetic retinitis			1	0.006	1	0.005
Epicanthus	2	0.036			2	0.009
Exophthalmos, toxic	2	0.036	3	0.019	5	0.023
Familial macular degeneration			2	0.013	2	0.009
Interstitial keratitis	3	0.054			3	0.014
Iritis and uveitis	4	0.072	7	0.044	11	0.051
Keratitis	1	0.018	2	0.013	3	0.014
Keratoconus	1	0.018	2	0.013	3	0.014
Monocular exophthalmos	1	0.018			1	0.005
Myopic chorioretinitis	2	0.036	16	0.101	18	0.084
Optic atrophy	2	0.036	9	0.057	11	0.051
Pterygium			9	0.057	9	0.042
Retinitis pigmentosa	1	0.036			1	0.005
TOTAL					206	0.961
Total Defects					4,581	21.36

glasses, and, in many instances, not through lack of funds, as agencies furnish glasses throughout most of these counties. A surprising number of men were wearing from plano to plus 0.25D. sphere.

Congenital defects (omitting amblyopia) were only 0.43 percent, congenital cataract being the leader with 0.144 percent. These figures were not excessive and speak well for this group.

Traumatic injuries are the disgrace of childhood; they are in many cases the result of carelessness, usually in the home. The history of injury with scissors, knives, air rifles, and arrows, all too well explains the traumatic cataracts or enucleations. No industry would permit such an appalling figure among so relatively small a group. In fact very few of these men obtained their ocular injury in industry. We are at a loss as to the best educational method to suggest in preventing this waste of sight. A mother with many children cannot always watch what a child is doing, but it is certain that scissors and knives should not be among accepted children's toys. Apparently surgical care of these cases has been adequate and well done.

Among the ocular diseases blepharitis, conjunctivitis, and chalazia were very low. The chorioretinitis and uveitis cases were the usual focal-infection type and comprised 0.456 percent. Often these men had never seen a physician, or, if treated, had in many instances poor medical care, as no search for focal infection had been made. This is particularly true of the rural population.

History of trauma could seldom be obtained in the detachment cases, so they were listed under acquired diseases. Only one case had a history of operation.

Five cases of toxic exophthalmos was rather high among this age group; two of these men had been operated upon. As compared with office practice the number of cases of interstitial keratitis was low. Optic atrophy was frequently associated with chorioretinitis. Retinitis pigmentosa was probably higher than is here shown, for an eyeground study was not made in all cases.

The cases of familial macular degeneration were in brothers. The number of cases of myopic chorioretinitis, 0.884 percent, was high, but this would naturally be expected as the number of men with high myopia was large.

Conclusion

Of 21,446 men going through the Altoona Induction Station, a total of 21.36 percent had eye defects that lowered vision to 20/40 or less. This, excepting hyperopia, represents a fair cross section of eye defects in central Pennsylvania.

1200 Fourteenth Avenue.

THE FORM AND CHARACTER OF ROD SCOTOMETRY

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Dark-room field testing is not in itself new. The method in the main has aimed at excluding extraneous effects likely to induce attention waver. Detailed consideration does not appear to have been given to the encouragement of rod response only, while calling upon the cones to fulfill the role of central fixation. So far, instruments have appeared designed with controlled sources of electric light for fixation object and for target. It is not easy to obtain a lighted target of a value that lies safely below cone threshold. A mechanism involving rheostatic control with the addition of filters is then necessary to influence both the luminosity and the color temperature. As complications multiply, so does expense increase and mobility become restricted.

To circumvent these difficulties, an alternative method has been sought, with a view to obtaining freedom from mechanical adjustment. Anticipation on the part of the patient, such as is encouraged by the rattle of cogs and the exactness with which the target arrives over the various areas, tends to produce an artificial atmosphere and restrict freedom on the part of the operator.

The problems that surround night vision have provided numerous avenues of approach. In the present instance it was believed that, in the dark-adapted retina, results might be achieved outside the range of standard procedures. Under the usual conditions that surround perimetry or scotometry, the hands of the examiner even though covered with black gloves, cannot be perfectly obscured. The unavoidable differences in background brightnesses between target holder and screen; shadows; the uncertainty regarding the exact point of appearance of the target, all influence the eventual records. As so frequently happens, these influences become more significant when it is of special importance to obtain accurate evidence regarding the nature of a suspected defect while in its earliest stages of development.

The introduction, in the Ophthalmic Department of the Royal Air Force, of self-luminous targets for visual tests in absolute darkness dates from 1935. At that time, attempts were made to learn the extent of form recognition adjacent to the fixation point as compared with form perception divorced from analysis. The conditions of illumination of the objects for identification varied between 0.0002 e.f.c. and 0.5 e.f.c. The self-luminous discs for these experiments were employed for purposes of fixation and were thus a little above cone level. These were moved over an arc at the center of which was a circular frosted-glass screen of 2-inch aperture, in which silhouettes of varying character, such as aircraft, ships, and crosses could be exposed for recognition.

Later, in 1940, work was commenced in which luminous objects now at rod level became the targets, while a red light, the luminosity of which carried well into cone function, acted as the point of fixation. Thus, a system of scotopic scotometry developed. The scope for this technique within the realm of clinical ophthalmology now becomes of widening significance.

Apparatus

The apparatus at this stage of development, consists of a one-meter Bjerrums screen, suspended from a central metal

pole. It is fixed in a strong frame that allows it to be firmly and evenly stretched in all directions. This facilitates the passage of the pins through the cloth without disturbance of the position of the screen. The side of the screen facing the patient is marked out in dots of white and red paint. The white dots indicate each degree and pass in a fan divided into 10-degree sectors from the fixation point to the periphery. The red dots run in circles around the fixation point and appear every five degrees. Such an arrangement simplifies the transfer of the record to the scotoma chart. As the test is carried out in complete darkness no adverse effects occur from the presence of the large number of dots. The fixation point is provided by a red light, from a 4-V dry-cell battery fitted to the stand. The bulb is set in a light-trapped black metal tube, so that, when burning, there is no escape of light except through the aperture providing the fixation point. By a suitable system of baffling, the pencil of light is lost to sight should the fixating eye commence to wander, a fairly common experience in dark-room studies of visual function. Refixation after wandering is readily encouraged. Provision is made for the adjustment of the height of the fixation tube so that each subject can be seated with eye height accurately adjusted to the pencil of red light. The character of the red light is important. It should be represented by a 1-mm. pencil shining through a rather deep-red filter approaching Wratton 89A. In trapping the source of the fixation light so that no movement of the field margin can come about, it is important to exercise care in the design of the tube baffles and also to employ for the chosen color a form of red that is attractive to the cones, but exercises the least possible effect upon the rods. Traquair's target holder was modified so that a target could be fitted to either end. It was also strengthened, and metal caps were made to cover the self-luminous targets when they were carried through lighted rooms. This modification permits suitable freedom of movement by the operator. The self-luminous targets are composed of radium paint treated with varnish so as to vary the candle powers. The expression "candle power" seems rather overwhelming in view of the infinitely reduced power of the light source, but after due consideration it was voted the best form of expression. A suitable range of luminosity for screen testing is found to lie between 6×10^{-9} and 40×10^{-9} candle power in sizes of 1, 2.5, and 5 mm. The targets must be kept in the dark. Should exposure to light take place, a change in brightness occurs and the work should be postponed until the target has been replaced in darkness for one hour. The life of these targets without appreciable alteration in brightness can, it is said, be counted in years. For plotting, colored glass-headed pins are employed, so that when two or three tests are undertaken during the same period of darkness, no confusion arises during transfer of the record to the chart after the room light is turned on.

Preparation and Test

For this test to be of value, it is essential that the room in which it is conducted can be made completely dark. First, a routine screen examination is carried out in daylight. It is then explained that the principle of the test will be repeated in darkness, that a red light will substitute the white fixation spot, and a self-luminous target will replace the white test object. The subject wears dark neutral adaptation goggles of a light transmission of 3 percent (fig. 1). Adaptation is carried on for 30 minutes, and there is an added period in the dark room of 5 minutes to accustom the patient to the situation. It is

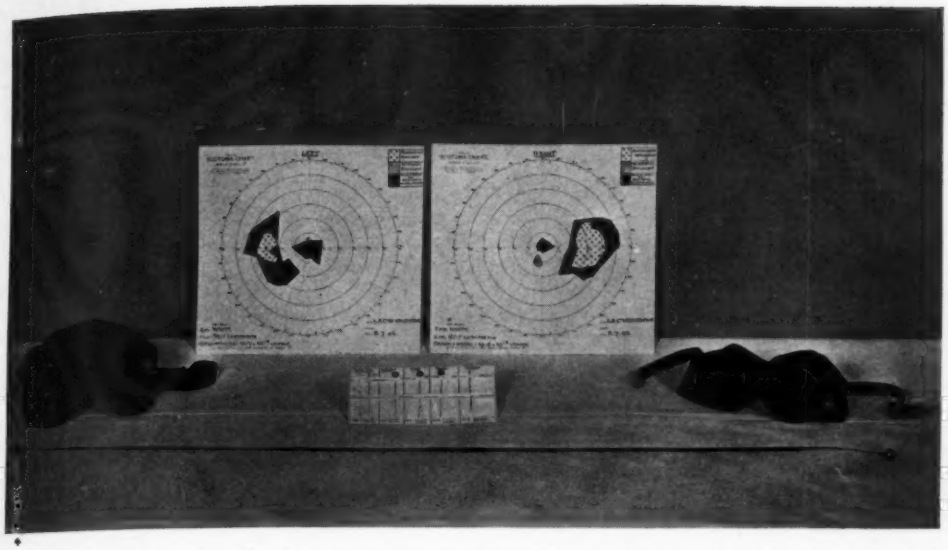

Fig. 1 (Livingston). Showing the patient's adaptation goggles on the left, the operator's goggles on the right, the test holder with two radium targets, a standard series of targets in folder, and two fields of vision. The fields here shown resulted from the examination of a case of papilledema. Note the considerable increase in the size of the blind spot (black) when examined in the dark, compared with the blind spot (crosses), by daylight testing. The dark method has revealed a spread in the exudate.

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better, although not essential, for two operators to work together plotting the field, one moving the target the other marking with the colored pins. By this procedure, a minimum of disturbance takes place and the operator with the target can devote his time to concentrating upon the field area according to the nature of the case before him. The operators should prepare by adapting behind red goggles in which a neutral filter has been incorporated. The light transmission is approximately 4 percent. Red-neutral goggles are useful as they permit more latitude of movement during adaptation and do not prevent work being continued. Fifteen minutes of adaptation suffices, because full stability is not required by the operator, as with custom much skill in picking up the target, using wide eccentric fixation, can be acquired. The trick of fixating about 15 degrees away from the target soon becomes a habit. It is rarely found that the patient experiences difficulties. The target should be moved slowly and steadily. A check upon the patient's attention and understanding can be provided by turning the target over, thus extinguishing the source of light. This effect is much more absolute than is experienced with the daylight technique. The margins of perception are sharp, so that the point of loss and reappearance of the target can be verified without any need to change the original pin positions.

Results and Interpretations

Physiologic features. Targets below cone threshold produce a central scotoma, the area of which is normally enclosed within a circle of 2 to 3 degrees. It is sometimes found that the scotoma is oval or egg shaped, with its major spread lying in the horizontal axis (fig. 2). The blind spot is always larger than that recorded in daylight. The explanation, no doubt, lies in the state of myelination of

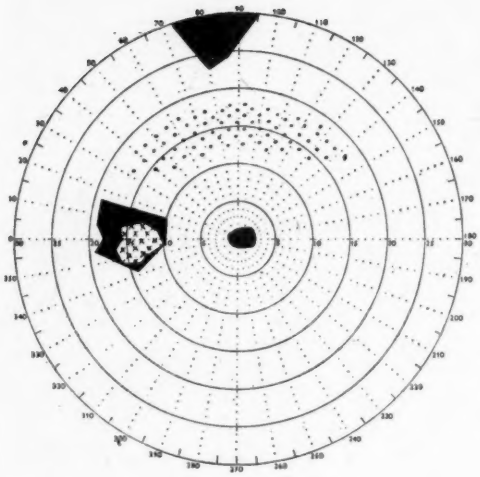

Fig. 2 (Livingston). This field exhibits the characteristic features found in normality at ground level. These are: (a) egg-shaped central scotomata, long axis, horizontal; (b) increase in blind spot over that found by daylight test; (c) presence of area of increased rod sensitivity indicated by dots; (d) triangular scotoma apex down lying between 70 degrees and 95 degrees, 23 degrees from the fixation point.

Test objects: 2 mm. white; 2 mm. self-luminous; brightness = 0.000000007 f.c.

Crosses = ground level, lights on; solid black = ground level, lights off, after 45 minutes dark adaptation; dots = area of rod hypersensitivity. Vision 6/6 6/6; date January 12, 1943.

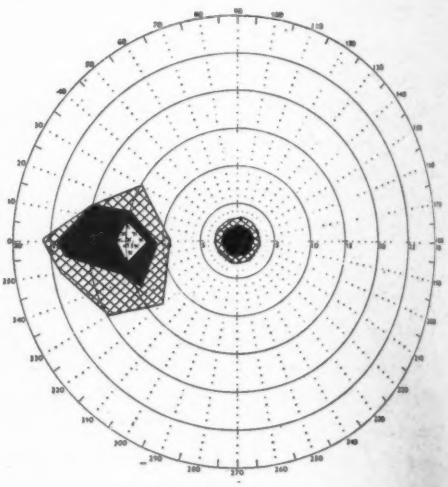

Fig. 3 (Livingston). The effect of anoxemia upon a resistant subject. Observe the slight increase in the size of the blind spot and also the central scotoma. Compare this with figure 4.

Test objects: 2 mm. white; 2 mm. self-luminous; brightness = 0.000000003 f.c.

Crosses = ground level, lights on; solid black = ground level, lights off, after 50 minutes dark adaptation; cross-hatching = at 17,000 feet, after 35 minutes at that altitude. Vision 6/6 6/6; date February 24, 1943.

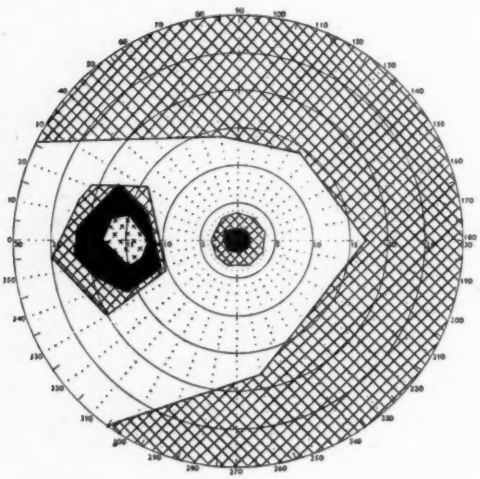

Fig. 4 (Livingston). The effect of anoxemia upon a normal but susceptible subject. Note the brief period of 15 minutes at 17,000 feet which has revealed an extensive contraction. Compare this with figure 3 when the subject was exposed for 35 minutes at the same altitude, and revealed no peripheral contraction.

Crosses = ground level, lights on; solid black = ground level, lights off, after 50 minutes dark adaptation.

Test objects: 2 mm. white; 2 mm. self-luminous; brightness = 0.000000003 f.c. Vision 6/6 6/6; date February 3, 1943.

the nerve fibers at the disc. As the stimulus is extremely delicate it fails to excite a reaction which would be elicited in the light. If a very small target of say 7^{10-9} candle power is employed, it is found possible to plot the course of the chief retinal vessels. To effect this, the target is passed backward and forward across the vessels, with a slow movement of narrow amplitude. Toward the periphery of the screen, a scotoma appears in about 20 percent of cases. This begins above the fixation point, starting some 20 degrees out; it is triangular in shape with its apex pointing downward. This may be regarded as representing a remnant of the secondary optic vesicle in which no abnormal ophthalmoscopic appearances can be observed. An area of high rod sensitivity is found 12 to 18 degrees outward and upward. It has been shown to coincide with histologic patterns, which are reported by Østerberg to form a more or less complete ring about the macula. This zone of hypersensitivity encircles the fixation point.

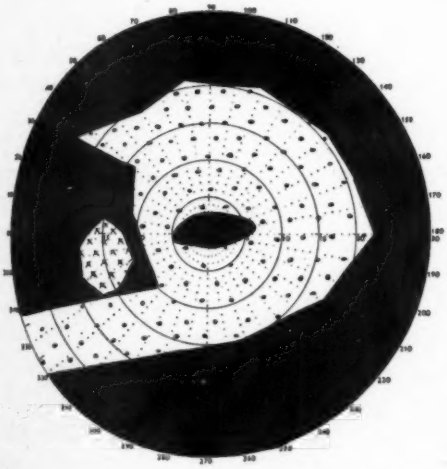

Fig. 5 (Livingston). The field in an early stage of vitamin-A deficiency, showing defects in the form of paracentral contraction combined with enlargement of the central scotoma. Test objects: 2 mm. white; 2 mm. self luminous; brightness = 0.000000013 and 0.000000006 f.c. Crosses = normal blind spot, day, 2 mm. white; solid black = central scotoma, peripheral contraction, target 0.000000006; dots = insensitive over whole area, target 0.000000013.

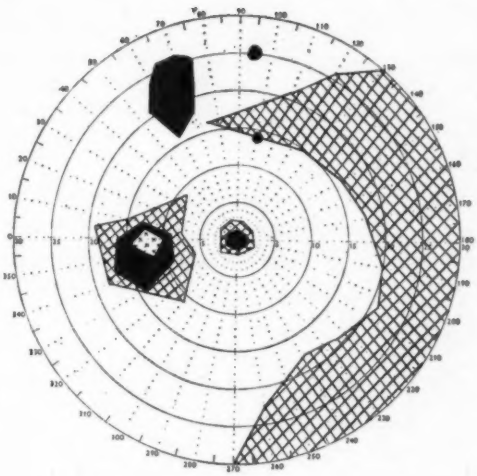

Fig. 6 (Livingston). A diabetic subject since 1939—insulin until 1942—now on restricted carbohydrate diet. Sugar 1+.

Field of vision ground level, shows two characteristic small circular scotomata. The third and larger scotoma may be associated with the congenital closure defect described in the text. At 15,000 feet after 15 minutes, a relatively big contraction of the field of vision is revealed. This is considered quite abnormal for the altitude and exposure time recorded. The majority of diabetic subjects are more susceptible to anoxemia than are normal subsubjects.

Crosses = ground level, lights on; solid black = ground level, lights off, after 45 minutes dark adaptation; cross hatch = at 15,000 feet, after 15 minutes at that altitude.

Test objects: 2 mm. white; 2 mm. self-luminous; brightness = 0.000000003 f.c. Vision 6/6 6/6; date June 17, 1942.

Physio-pathologic features. A contraction of the field with an enlargement of the macular scotoma and blind spot, is found in anoxemia when brought about in the low-pressure chamber (fig. 3). Changes in the field become evident after 20 minutes at an altitude of 17,000 feet. The reaction is a delicate one with a wide variation between different subjects (fig. 4). Defects, in the form of paracentral contraction, combined with enlargement of the central scotoma, may appear at an

(Concluded on page 428)

OCULAR ROSACEA AND ARIBOFLAVINOSIS

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Coincidently with the publication in this Journal of Wise's thesis on "Ocular rosacea"[1] comes a further contribution to the subject from Conners, Eckardt, and Johnson.[2]

Wise's researches into the etiology of this disease cover a wide field, whereas the investigations of the Cleveland group are mainly confined to the biochemistry of riboflavin, its excretion by rosacea subjects, and the treatment of such cases by vitamin B_2 therapy, although in previous papers they have published statistics of gastric analyses[3] and touched upon the possibility of a Demodex factor in ocular rosacea.[4]

On almost all points the findings of Wise and of the Cleveland group are diametrically opposed; two points, including one of fundamental importance, are mentioned by neither. It is on this point —namely, the type of corneal vascularization found in ariboflavinosis[5] and not found in ocular rosacea—that a series of clinical investigations carried out by the present writer[6] may fill a gap. Incidentally, they demonstrate the other point omitted by Wise and the Cleveland investigators; namely, that, at least in Oxford, rosacea is characterized by a marked seasonal incidence.

During routine slitlamp examination of sections of the population of England with the Oxford Nutrition Survey in 1942, although some cases of ariboflavinosis were found, there were none of ocular rosacea; but at the Oxford Eye Hospital the "rosacea season" was just beginning, and all such patients were examined with the slitlamp. They were divided into two groups, unilateral and bilateral, in order to obtain, in the former group, a control eye per patient in which to look for the type of corneal vascularization constant in ariboflavinosis, unmasked by corneal infiltration or ulceration.

It was assumed that if ocular rosacea were the direct result of riboflavin deficiency, as stated by Johnson and Eckardt, these rosacea patients would show the specific type of corneal vascularization characteristic of ariboflavinosis. This is always bilateral, though not always equally advanced in both eyes; it is always symmetrical—that is, it invades the whole circumference of the cornea in both eyes, although, owing to the sclerocorneal "overlap" in the segment of the cornea covered by the upper lid it is rarely conspicuous there; it forms a more or less regular pattern of very fine, streamerlike superficial vessels which proliferate from the limbic loops of the pericorneal plexus and unite to form new tiers or arcades in the clear corneal substance, sometimes encroaching almost to the pupillary area. This stage is best seen by retroillumination. Circumcorneal injection is frequently absent until a late stage, when deep vascularization and corneal opacities may appear, with, in some cases, iritis. The picture in an early stage is entirely unlike that of ocular rosacea with its irregular, localized infiltrates that progress across the cornea just ahead of a leash of vessels and separated from them by a clear space. In later stages of both conditions the deep vascularization may be the result of secondary sepsis, but in the only two severe cases of ariboflavinosis seen in Oxford the corneal opacities

TABLE 1

SLITLAMP EXAMINATION OF 45 CASES OF DERMATOLOGIC ROSACEA

	Unilateral Ocular Rosacea	Bilateral Ocular Rosacea	No Ocular Rosacea
Corneal vascularization, B_2 type, present.	0	0	1(a)
Corneal vascularization, B_2 type, absent.	40	3	1(b)

* Corneal vascularization, B_2 type = the bilateral, symmetrical type found in ariboflavinosis (with or without the irregular, localized type found in ocular rosacea).

were symmetrical, and there was much less local vascularization than would have been present in ocular rosacea of this degree.

Table 1 shows the result of slitlamp examination of 45 cases of dermatologic rosacea, in 43 of which there was ocular rosacea.

Of these 45 cases only one—case 1(a)—showed the B_2 type of vascularization. In this case, although there was mild cutaneous rosacea, there was no ocular involvement from it. Within a month, the cornea became almost normal on B_2 therapy, the new vessels being visible only as "ghosts." The cutaneous rosacea was unaffected.

Case 1(b) showed slight cutaneous rosacea without any corneal or other ocular abnormality and was not treated.

INCIDENCE

Seasonal incidence. Spring and early summer brought 42 cases under observation, midsummer only 1, and autumn, 2.

Sex incidence. Of the 45 patients, only 2 were males.

Age incidence. The youngest patient was 24 years old, the oldest 76. The average was 45 to 55 years.

THERAPEUTIC TEST

After slitlamp examination 20 of the patients were taken at random and divided in two groups, 10 in each. Group A received riboflavin only. Group B received routine treatment without riboflavin. Subsequently group A, having failed to respond to B_2 therapy, was given routine treatment in addition to riboflavin. The 23 remaining patients in group C received routine treatment and riboflavin, as shown in table 2.

The rate of healing varied with the severity of the lesion rather than with the age of the patient, although naturally most of the severe cases were among the older patients, owing to previous attacks of keratitis. These were the cases most prone to secondary sepsis. The addition

TABLE 2

RESULTS OF TREATMENT OF 45 CASES OF DERMATOLOGIC ROSACEA

Number of Cases	Treatment	Response
10 Group A	Riboflavin only	No improvement or exacerbation
10 Group B	Routine only	Healed
10 Group A	Routine and Riboflavin	Healed
23 Group C	Routine and Riboflavin	Healed
1 (a)	Riboflavin only	Healed
1 (b)	None	None

of riboflavin to routine treatment did not increase the rate of healing.

Probably the deprivation of mydriatics and antiseptics under test conditions accounts for the exacerbations in group A when on riboflavin only, although Johnson and Eckardt state that ocular rosacea clears up within four days on riboflavin. On the other hand, Wise found no improvement after very large doses of vitamin B_2 administered both orally and intravenously over periods of some six weeks or more; on the contrary, some of the lesions flared up. The Oxford patients received 9 mg. of riboflavin orally per day for one or two weeks—until, in fact, it became apparent that it would be unwise to risk further deterioration of the cornea by depriving them of other treatment. Cases of ariboflavinosis—apart from rosacea—do not often respond promptly to B_2 therapy when, although mild, they are of long standing, but exacerbation during treatment is rarely if ever seen.

Routine treatment for ocular rosacea consisted of mydriatics where indicated, antiseptic lotions or drops for the eyes, dark glasses, sulpho-calamine lotion for the skin, dilute hydrochloric acid to be sipped with meals in cases suspected of gastric dysfunction, and, in selected cases,

CONCLUSIONS

Wise, New York	Johnson & Eckhardt, Cleveland	Fish, Oxford
Ocular rosacea follows facial rosacea and both are manifestations of the same disease.	The incidence of rosacea keratitis without acne is so much greater that the occurrence with it is now considered almost a coincidence.	Same as Wise.
Rosacea is not a manifestation of riboflavin deficiency.	Rasacea keratitis is the direct result of riboflavin deficiency.	Same as Wise.
Except in . . . rare cases . . . most of the distressing symptoms and sequelae of ocular rosacea are due to secondary infection with staphylococci.	(There is) absence of the bacterial conjunctivitis which is said to be the initiating factor in catarrhal ulcers.[7]	Same as Wise.
The secondary infection in ocular rosacea can be controlled in almost all cases with a 5-percent sulfathiazole or sulfadiazine ointment used several times a day.		The secondary infection can be controlled by 10-percent albucid drops applied locally three or four times daily.
Rosacea probably is due to some factor causing vasodilatation in the facial area.		Same as Wise.
	The triangular characteristic of the superficial capillaries remains as the sole differential criterion.[7]	The triangular area of vascularization is characteristic of ocular rosacea but not of ariboflavinosis, nor is the B_2 type of vascularization present in rosacea.
Very large doses of riboflavin were given, in some cases over lengthy periods.	In addition to riboflavin, vitamin-B–complex was given, one teaspoonful of which contains therapeutic amounts of the whole B complex. Eggs, liver and milk were added to the diet.	Riboflavin was given only in a series of controlled cases. No special diet nor other treatment of any kind was given to these 10 patients in Group A until exacerbation became dangerous.

peritomy, tonsillectomy, or meibomian massage through the lids; 10 percent albucid (sulphacetamide) drops are now being used with good results, and treatment for seborrhoea capitis given in some cases.

All the Oxford patients had cutaneous rosacea but only one of them, case 1(a), appeared to be on a B_2-deficient diet; many were farmers and had more milk, butter, eggs, and vegetables than the average citizen. In the Cleveland series of 36 patients only 9 had "some cutaneous type of rosacea," and 34 were on a diet deficient in eggs, liver, and milk. Only one of the Oxford patients, the oldest, had iritis. The youngest patient, with a refractory case, did well after tonsillectomy. Three of the worst cases had recurrent meibomian infection and derived great benefit from meibomian massage; staphylococci were present in the expressed secretion, but no Demodex were found. Two very severe cases, both unilateral, required repeated peritomy. All the patients reported exacerbations when the eyes became sticky and secondary infection was obvious.

It seems probable that, in the Cleveland series of cases, the beneficial results attributed to riboflavin may have been due to the combined effect of all the constituents of the B-complex together with generally improved diet.

Biochemical research in the concentration of riboflavin in ocular tissue[8] leads one to expect improvement in ocular rosacea from B_2 therapy, but neither slit-lamp examination nor therapeutic tests confirm the claim that this disease is due to a deficiency of riboflavin.

Note: J. H. Doggart, in a paper on "Ocular rosacea" (Trans. Ophth. Soc., 1930, v. 1, pp. 98-109), describes an "encroachment of conjunctival vessels for a varying distance in the cornea, not only in the situation of definite infiltrates, but around its whole circumference," and figure II, reproduced in Duke-Elder's Textbook of ophthalmology, v. II, p. 1724, shows the typical corneal vascularization of ariboflavinosis with superimposed ocular rosacea. I have never seen both these types of vascularization, as thus depicted, in the same eye.

I should like to express my appreciation of the help given in this work by Prof. V. P. Sydenstricker, of the Georgia School of Medicine, Augusta, Georgia, who examined seven of the cases, including case 1(a); Miss Ida Mann, Mr. A. C. L. Houlton, and other colleagues at the Oxford Eye Hospital; Mrs. Pirie, of the Nuffield Laboratory, Oxford Eye Hospital; Dr. Hugh Sinclair and colleagues at the Oxford Nutrition Survey; Dr. Alice Carleton, of the Department of Dermatology, and Dr. Roy Vollum, of the Department of Bacteriology, Radcliffe Infirmary, Oxford.

I am indebted to Dr. V. P. Sydenstricker for the information that ocular rosacea is a rare disease in the southern states of America, whereas ariboflavinosis is—or was—not uncommon there; also for kindly correcting the proofs of this paper.

"The Cardinal's Hat," 6 Holywell.

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THE PSYCHOGENIC COLOR FIELD

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Color fields have been used for some time in relation to organic disease of the eye, but the purpose of this article is to show that they have a possible application in the field of psychosomatic medicine. Traquair and Peter have shown that in certain types of individuals form fields may be either restricted, or of the spiral type. But the present writer has not seen a report of the application of color fields to those who have a psychogenic factor.

As already mentioned colors are sometimes used to determine the extent of lesions of the retina and nerve. For example, in retinal detachments there is a loss of the blue field, especially in the area of the detachment, while in the diseases of the optic nerve the red field is either restricted or the color is not seen.

In the neurasthenic patient there is a

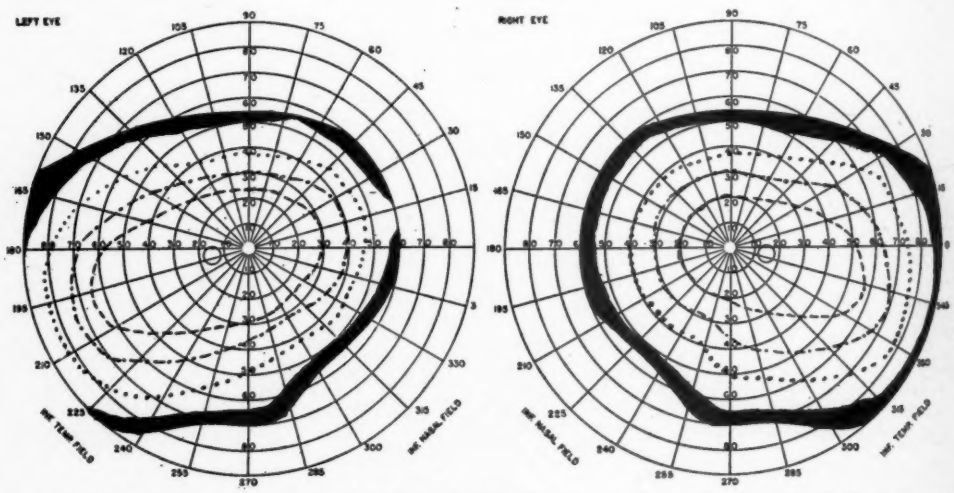

Fig. 1 (Reeder). Normal form and color field. The sizes of targets for the field in the four figures presented are 2/330 for the form, 5/330 for the color fields. Dots = blue; dot dash = red; dash = green.

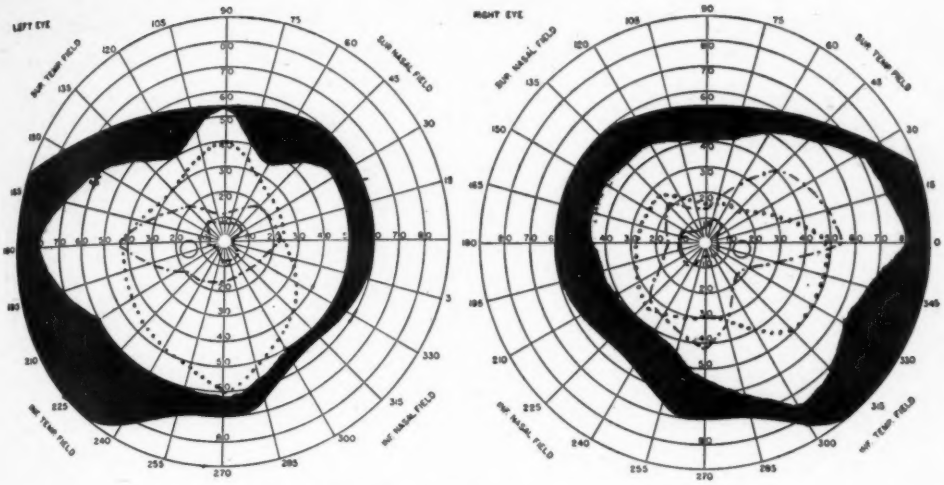

Fig. 2 (Reeder). Psychogenic field, mild.

change in the way the colors are arranged, and also in the size of the field of colors. The normal field for form and color is as shown in figure 1. As one can see, there is a wide range of even monocular vision. A normal color field will show the same contour as the form, except that the blue will extend only to a point about 25 degrees inside the form. The red, which is next in turn, will extend to within 10 degrees of the blue, and the green will extend to within 10 degrees of the red.

In the abnormal field there is a marked decrease in the size of the form as well as the color. The fields are irregular in shape also, but the most decided change is that of the position of the colors. Instead of being from without in, the colors are interlaced or they may even be inverted. It may so happen that the colors extend outside of the form limits.

In the study at this hospital a series of

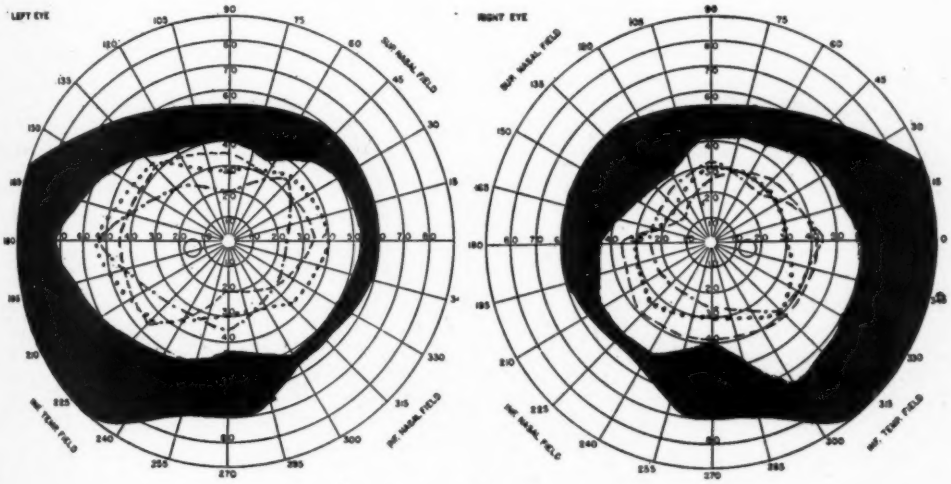

Fig. 3 (Reeder). Psychogenic field, moderate.

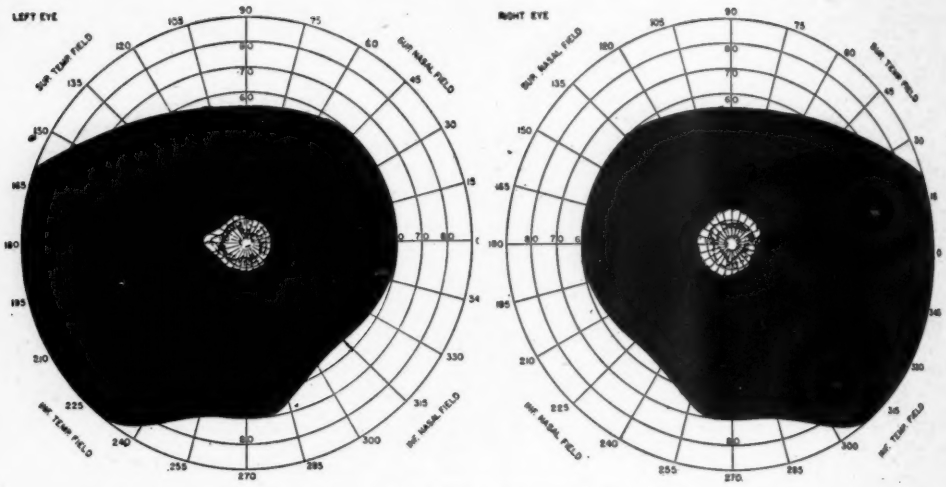

Fig. 4 (Reeder). Psychogenic field, severe. Green is the very small innermost field.

cases was chosen in which there was no evidence of pathology or only a visual error that could be corrected to normal. These cases came from all departments, and had all types of complaints. However, at no time was there any definite change that was pathologic. No other criterion than the one mentioned was used in the selection of the cases. The majority of the patients came from the Neuropsychiatry Service. Twenty-seven were seen in the Eye Department and an additional 19 were sent in by others. All of those from the Neuropsychiatric Service were psychoneurotics who complained of some type of eye symptom from pain to poor vision. It was ruled out that there was any pathology before the fields were taken.

Not all of the cases were as well defined as some, but they all showed some change that was functional. Of the 87 patients examined, 64 exhibited the psychogenic field, which ranged from mild to severe. This is evidenced in figures 2 to 4.

Many of the patients presented bizarre symptoms that could not be substantiated by organic pathology. On the other hand, there were those who showed no definite pattern from the psychiatrist's point of view, and the only change that could be demonstrated was that of the functional oberration in the color fields. An illustration of the bizarre symptoms

TABLE 1

SHOWING THE DISPOSITION OF THE CASES

Source	Number	Mild	Moderate	Severe	Normal	Percent	Disposition Duty	Disposition Cdd
Eye Dept.	27	1	6	11	8	30.2	8	19
Neuro-Psychiatric Service	41	5	11	23	2	47.6	0	41
Others	19	1	6	10	2	22.9	7	12
Totals	87	7	23	44	12			
Percent	100	8.1	26.7	51.1	13.9	100		

was found in a man who came in with the complaint of constant priapism. No organic cause for this was found. Examination of the other systems of the body was made but no pathologic basis was found. Examination in the Eye Department revealed no abnormalities of the visual apparatus, and on questioning the patient unexplainable discrepancies were found in his story. A form and color field were outlined, and a functional change was found. The psychiatrist then examined the patient, and after four or five conferences was able to establish a functional diagnosis. It was believed that the fields in this case were a definite help in giving a lead in a case that was obscure from a psychoneurotic standpoint. The obscurity is due to the fact that some of the patients who come in are unwilling to talk, and the psychiatrist is unable to get a lead. Fields in a case such as this help to give the psychiatrist a point of departure in making his examination.

The table is self-explanatory in that it shows where the cases originated, and their ultimate disposition.

Conclusion

It has been demonstrated that the psychogenic color field is of definite aid in the establishment of a psychoneurotic diagnosis. It is tangible evidence in an otherwise abstract diagnosis. It is a test that cannot be faked, therefore malingerers cannot make use of it. As in all things medical no claim is made that this test is infallible, but when the test is positive it is an aid to diagnosis. In this series all of the psychoneurotic patients did have the change in the color fields, from mild to severe. Eighty-seven cases were reviewed; 72 were separated from the service for psychogenic reasons; 19 of the 72 were discovered by their psychogenic type of color field before they had had any association with the neuropsychiatrist.

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TUMOR OF THE LACRIMAL GLAND*

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The lacrimal gland is rarely the site of pathologic processes. The reasons for this are its small size, excellent blood supply, dependent drainage, and protection from traumatic influences. Pathologic swellings of this organ may be considered in four groups: 1. Inflammatory processes. Infection may be an acute suppurative one or one of the forms of bilateral chronic granulomatous hyperplasia, commonly syphilitic or tuberculous. 2. Neoplasms. 3. Cysts or dacryops. These may result from retention of secretion due to obstruction of the lacrimal ducts. 4. Mikulicz's disease. Various forms of this unique syndrome occur in blood dyscrasias particularly leukemia. It also occurs physiologically in weeping and menstruation.[1]

Tumor of the lacrimal gland is usually of the mixed type.[2] Ziporkes[3] stated that "The salivary and lacrimal glands are the seat of mixed tumor and are probably derived from the buccal ectoderm, with possible admixture from the maxillary periosteum or the branchial cartilage. They represent elements in the form of strands of cells, alveoli, diffuse masses of mesoblastic tissue, chiefly cartilaginous, mucous and cellular connective tissue. Any of these may predominate, giving rise to nearly pure chondroma, sarcoma, or carcinoma, but usually all the types of cells are represented." Mixed tumors occur in various forms from highly differentiated types to infiltrative anaplastic carcinoma. They are to be regarded always as potentially malignant. As a rule they are well encapsulated and grossly firm. When invasive they tend to erode into the cranial cavity through the roof of the orbit. They rarely metastasize but are very prone to recur locally after removal.[1]

SIGNS AND SYMPTOMS

The first and most constant symptom is proptosis of gradual onset. The eyeball is displaced downward, nasalward, and forward from the socket. Diplopia is exceedingly annoying. The displacement of the images is vertical and is increased when the patient looks toward the side of the lesion. In a few cases the proptosis is extreme. In the case herein reported the eye had repeatedly extruded between the lids, which would fall behind it. This caused such excruciating pain that manual replacement of the lids had to be done under general anesthesia. Vision in the affected eye may be compromised because of traction upon the optic nerve as the eye is slowly and gradually luxated. This diminution in visual acuity may disappear or become much less marked after successful removal of the tumor.[4] Pressure on the posterior portion of the eyeball may indent it, producing the ophthalmoscopic picture of detachment of the choroid.[3] The cornea may be exposed and develop exposure keratitis. The visual field may be normal or show a small central scotoma for form and color.[4] A firm mass is usually palpable in the region of the superior lateral orbital margin under deep pressure of the finger.

DIFFERENTIAL DIAGNOSIS

Proper classification of these cases compels a consideration of all the causes

* From the Indiana University Hospitals.

of exophthalmos. Dermoid cyst may be primary in the upper lid and should be considered in all cases in which the proptosis is slight and enlargement of the upper lid is marked. An aneurysm often pulsates, and a bruit may be heard over it. Retro-orbital hemorrhage and abscess are to be considered. One should remember luetic periostitis of the orbit, also soft, fluctuant mucocele extending from the anterior ethmoid or frontal sinus. The rare glioma of the optic nerve is to be seriously considered if there is complete blindness with dilated pupil and marked nerve-head pallor. In cases in which the ocular fundus cannot be seen, the possibility of a retrobulbar extension of a primary intraocular malignancy must be borne in mind. Measures should be taken to rule out systemic conditions producing exophthalmos, particularly Hand-Schüller-Christian's disease and Graves's disease. Careful neurologic examination should be conducted in all cases. Radiologic studies are exceedingly important in the diagnosis, prognosis, and intelligent selection of the route of surgical approach. Roughening, distortion, or asymmetry of the sphenoidal ridges leads to suspicion of orbital extension of an intracranial growth or *vice versa*. Enlargement of the optic foramen usually indicates tumor of the optic nerve. Concentric expansion of the orbital walls betokens a large tumor requiring wide exposure. Radiologic evaluation of paranasal-sinus disease requires the attention of a competent radiologist. Some orbital tumors exhibit calcification, particularly hemangioma and Koch's infections.

Treatment

The treatment is surgical. Irradiation may be considered an adjunct only. Surgical approach to the lacrimal gland is made by one of three routes. The first of these is the direct approach through the skin of the upper lid or the conjunctiva of the superior cul-de-sac. This is satisfactory for small tumors but gives poor exposure; where the palpebral portion of the gland shows marked enlargement this may be the method of choice. The second approach is the Krönlein operation which gives excellent exposure by resection of the lateral wall of the orbit as a bone flap. This approach is peculiarly adaptable to lacrimal tumors which are usually laterally situated in the orbit. It gives access to growths above or within the muscle cone. The third method is the cranial approach. This is the most radical but has much in its favor. In cases in which the growth is large, the diagnosis uncertain, under conditions in which it seems highly desirable to save the eye, this method in good hands is excellent. It should always be used, of course, if neurologic signs of brain involvement are present. Because of the pronounced tendency of these tumors to erode the bony roof of the orbit, the removal of this involved bone cannot but decrease the number of recurrences from this cause. It is important to remember, however, that should it seem necessary at any time to exenterate the orbit, such an operation is difficult to perform from above at the time of the craniotomy and hazardous to perform at a later date from below because of the possibiltiy of meningeal infection. It is axiomatic in the treatment of these tumors that it is important to save the eyeball only if all the tumor can be removed.[3, 5]

Most of the cases in the literature have been operated on by the direct approach or the Krönlein approach. Chief among those who champion the cranial approach is Dandy,[6] who believes that all orbital growths should be attacked in his manner. It is his opinion that from 75 to

80 percent of all orbital tumors are also intracranial, that less radical procedures lead to incomplete removal of the tumor. It is needless to say that in cases in which there are obvious malignancy and total blindness with degenerative changes in the globe, total or subtotal exenteration of the orbit is the procedure of choice.

Case report

A white man, aged 45 years, was first seen in the out-patient Eye Clinic on August 18, 1941, complaining of a bulging left eyeball. There was a history of a gradually progressing exophthalmos of the left eye for eight years. The patient stated that he had been struck over the left eye with a shovel. There had been several attacks in which the eye had proptosed completely from the socket to be returned manually under anesthesia.

Corrected vision of the right eye was 20/13 and of the left 20/50. There was vertical diplopia increasing on levoversion, indicating relative elevator insufficiency of the left superior-rectus muscle. The left eyeball appeared to be displaced downward. The peripheral field of the left eye was normal with a 5/330 white stimulus, and the fundus examination of both eyes was essentially negative.

A tumor mass was felt at the upper outer angle of the left orbit and it was thought that the left lacrimal gland was either displaced or enlarged. No crepitus could be detected in the periorbital soft tissues after forcible blowing of the nose. The Zeiss exophthalmometer read 14 mm. for the right eye and 32 mm. for the left. The left upper nasal cavity was almost completely obstructed.

Blood counts and urinalyses were normal. Blood serum cholesterol was 450 and total lipids 1,032. The Kline and Mazzini tests upon the blood were negative. Neurologic examination revealed no signs of central-nervous-system involvement.

Fig. 1 (Flick). Preoperative photograph showing vertical and axial displacement of the left globe.

X-ray examination (fig. 2) revealed an increased density of the intraorbital contents on the left side, giving rise to a clouded appearance of the orbital shadow. There was some slight osteocondensation of the anterior nasal rim of the left orbit. The lacrimal fossa of the left orbit was seen to be enlarged to approximately twice the size of that of the right. There was definite thinning of the floor of the left lacrimal fossa produced by erosion, and the supero-lateral limits of the orbital wall in this region were irregular and partially destroyed. There seemed to be an area of bone destruction extending from the lacrimal fossa on the left side into the floor of the anterior

cranial fossa. The optic foramina were equal and normal in size and shape on the two sides.

On October 23, 1941, a small osteoplastic flap was reflected over the left frontal lobe by Dr. Robert L. Glass. The anterior limb of the flap lay just above the frontal sinus. The dura was elevated from the roof of the left orbit. The roof of the orbit was paper thin. Bony erosion was noted in the antero-lateral surface of the orbit, and a small amount of friable tumor was eroding through the bone in this region. The roof of the orbit was partially removed by the use of a rongeur. A large tumor was found in the orbit behind the globe. The tumor lay mostly in the lateral and superior divisions of the orbit and had displaced the eyeball forward and the cone of muscles medially. The tumor appeared to have a thin capsule. It was soft and friable and somewhat grayish in color. On its medial surface was a large cyst. The cyst was incised and a thin fluid containing much detritus was evacuated under pressure. Increased intraorbital pressure had caused erosion of the bony wall of the ethmoid cells, establishing free communication between these cells and the orbit. Examination of a frozen section was reported "probable malignant neoplasm." Complete removal of the growth appeared to be inadvisable. About three-fourths of it was removed. The pathologic report of Dr. Frank Forry is as follows:

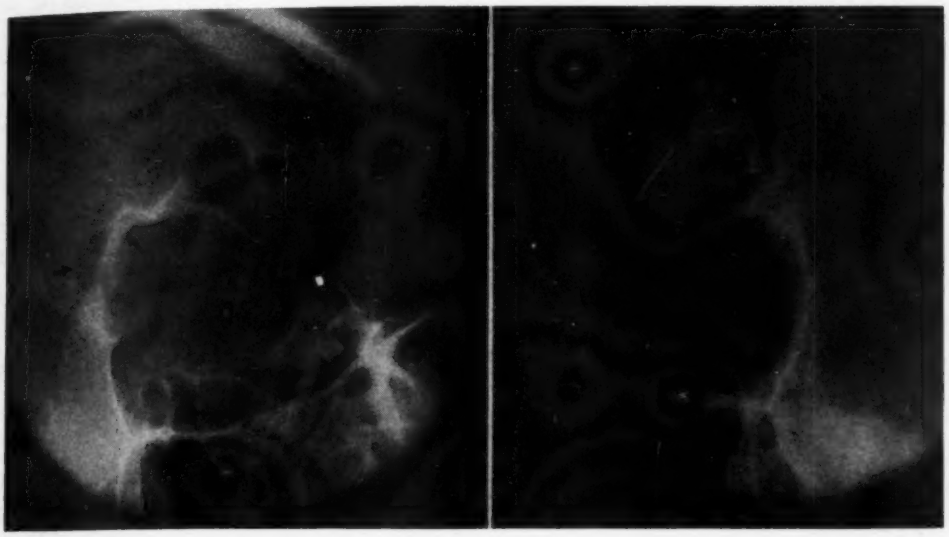

Fig. 2 (Flick). Roentgenograms of the orbits showing the equal and normal optic canals. Arrows indicate bony erosion and destruction in the region of the left lacrimal fossa.

The section for study is stained with hematoxylin and eosin. It shows numerous small, discrete masses of tumor tissue. These present a varied tissue pattern. In some areas tumor cells form alveolar masses outlined by a very delicate connective-tissue stroma (fig. 2, A).

In some other areas the tumor cells appear as cuboidal cells, lining spaces and thus form an adenomatous pattern. These glandlike structures are evenly spaced and are usually rather widely separated by masses of closely packed tumor cells (fig. 3, A).

In other areas the tumor cells lie in thick rings and masses separated by loose stroma (fig. 3, C). In still others the tumor cells form a loose, fine-meshed reticulum within which lie round, solid masses of cells. The center of such

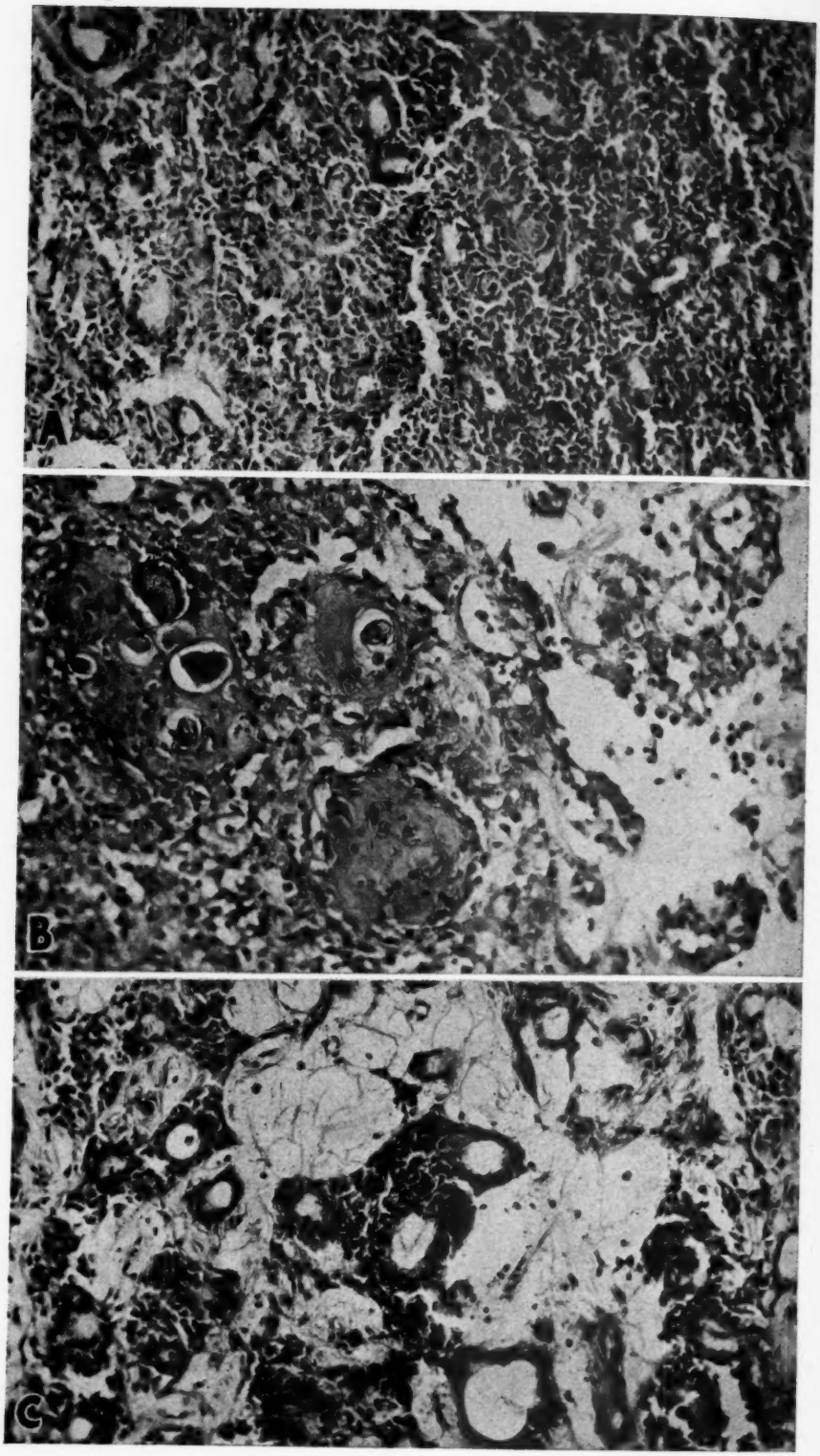

Fig. 3 (Flick). Photomicrograph showing the various tissue patterns found in different areas of the neoplasm.

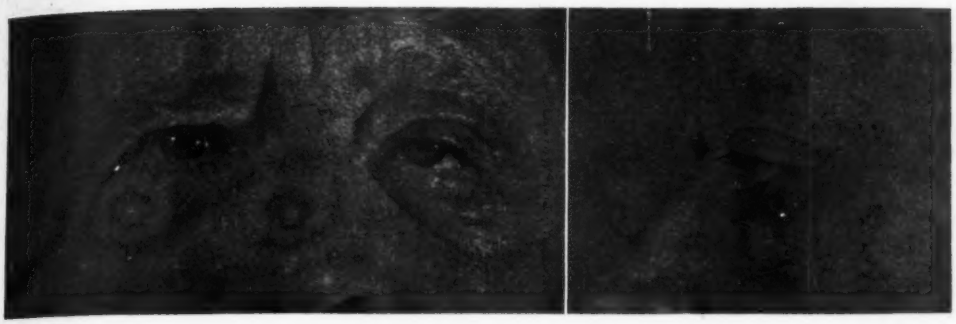

Fig. 4 (Flick). Postoperative photograph taken on the nineteenth postoperative day showing disappearance of proptosis.

masses tends to become hyaline and laminated. Spinous processes could not be demonstrated in any of these cells (fig. 3, B).

The tumor tissue is well vascularized and in some instances the tumor cells seem to form the blood channels. In most instances, however, there is a well-defined vessel wall surrounded by a zone of loose connective tissue; this, in turn, is sharply delimited by surrounding tumor tissue.

The tumor cells are epithelial in type and show a remarkable pleomorphism. They appear as round, oval, spindle, cuboidal, and stellate cells. The nuclei are round or oval. The nuclear membrane is sharply outlined. The chromatin is present as one or two coarse granules surrounded by fine dust, giving the nucleus a pale blue color. A moderate number of cells show karyokinesis. A pink-staining substance resembling ground substance, present in small amounts, occurs, with the delicate connective tissue stroma supporting the tumor parenchyma.

There are no cartilaginous cells, and lymphoid tissue is not present in this section.

Diagnosis: Neoplasm showing the features of adenocarcinoma.

The postoperative course was uneventful. The proptosis and diplopia both disappeared soon after the operation, much to the joy of the patient (fig. 4). He was advised to have a complete exenteration of the left orbit but refused. He was also advised to return for a series of deep X-ray treatments. This he did not do but he returned to the Eye Clinic for a check-up examination and photograph April 28, 1943, at our request (fig. 5). At this time the visual acuity in each eye was 20/15 corrected. The exophthalmometer read 17 for the right eye and 21 for the left. There was a distinct hollow in the left eyelid over the region of the lacrimal gland (see illustration). The pa-

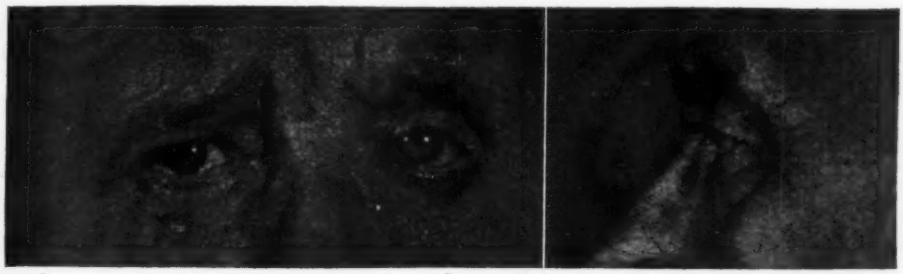

Fig. 5 (Flick). The patient 18 months after surgery. Note the exaggerated orbito-palpebral sulcus on the left.

tient made no complaint at this time.

Conclusions

1. Tumor of the lacrimal gland is a clinical as well as a pathologic entity.

2. Preoperative diagnosis is possible in a high percentage of cases.

3. The treatment is surgical.

4. A case of tumor of the lacrimal gland is reported.

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A REPORT ON DEFECTS FOUND IN TONOMETERS EXAMINED AT THE CHECKING STATION OF THE NATIONAL SOCIETY FOR THE PREVENTION OF BLINDNESS

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AND
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For several decades the ophthalmologic profession has regarded the Schiötz tonometer as a very useful instrument and necessary to our practice. However, more recently, ophthalmologists have come to realize that the tonometer is not so reliable an instrument as one would wish it to be.

Not only do different tonometers register varying tensions for the same eye, but successive measurements made with the same instrument may vary by as much as 3 to 4 or even more millimeters of mercury* in either direction, even though the technique is faultless. Consequently, a situation exists in which instruments used for measuring purposes do not measure but confuse; and when one considers that many ophthalmologists are prone to base their diagnosis of glaucoma mainly on the tonometric readings, the situation becomes quite serious. Errors of technique play an important part in causing inaccurate measurements; equally responsible for unreliability are defects in construction and performance of the tonometer.

The present report on defects discovered from the examination of 68 tonometers of the Schiötz type† supports the statements made in the introductory remarks of this paper. [Since writing this report we have examined 62 more tonometers.]

The specifications for the various con-

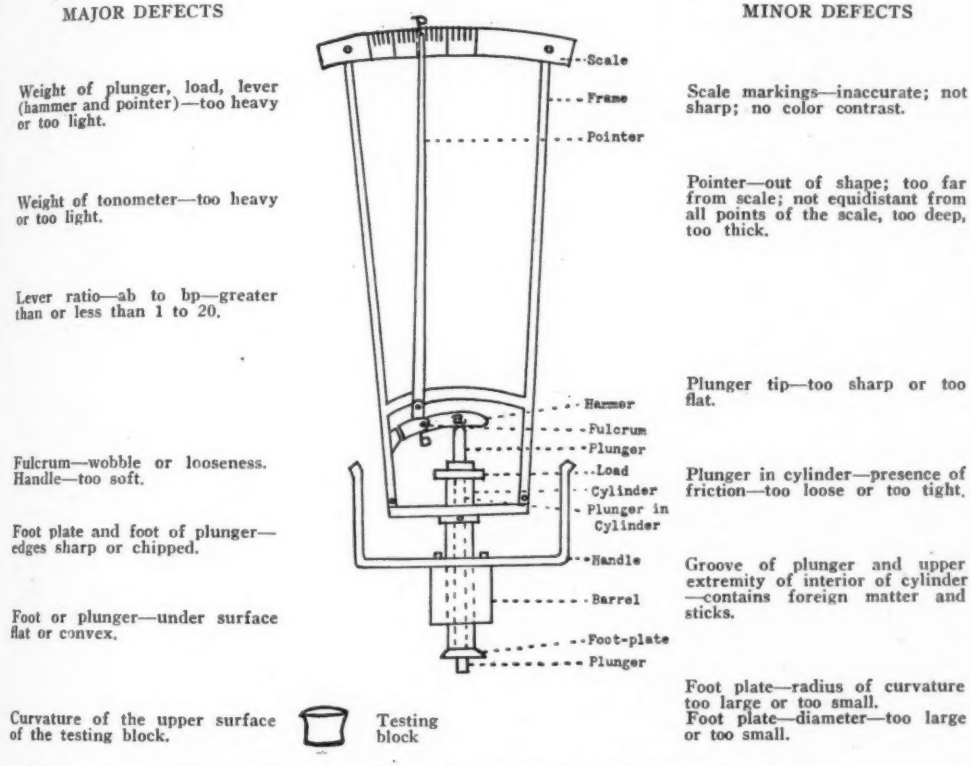
* Slight reduction of tension with successive applications of the tonometer might be ascribed to the massage effect, as pointed out by one of us (Schoenberg. Clinical and experimental research on intraocular drainage. Arch. of Ophth. 1913, v. 42, no. 2.). However, this lowering of tension takes place only after the tonometer has been applied continuously for 10 or more seconds (usually 20″ to 30″).

† Only tonometers of the Schiötz type were examined because of our familiarity with the specifications for and methods of examining instruments of this type.

stituent parts of the tonometer and for the instrument as a whole, as established originally by Professor Schiötz, were adopted as the standard for the instruments submitted for examination. In the course of time, it was found that several fects are classified as major and minor.

The major defects are those which concern those parts or units that are essential for the accuracy of performance, and each of these is a source of considerable error. The summation of two or more

Fig. 1 (Schoenberg and Posner). Major and minor defects discovered in tonometers at the checking station* of the National Society for Prevention of Blindness.


MAJOR DEFECTS
MINOR DEFECTS
Weight of plunger, load, lever (hammer and pointer)—too heavy or too light.
Weight of tonometer—too heavy or too light.
Lever ratio—ab to bp—greater than or less than 1 to 20.
Fulcrum—wobble or looseness. Handle—too soft.
Foot plate and foot of plunger—edges sharp or chipped.
Foot or plunger—under surface flat or convex.
Curvature of the upper surface of the testing block.
Testing block
Scale
Frame
Pointer
Hammer
Fulcrum
Plunger
Load
Cylinder
Plunger in Cylinder
Handle
Barrel
Foot-plate
Plunger
Scale markings—inaccurate; not sharp; no color contrast.
Pointer—out of shape; too far from scale; not equidistant from all points of the scale, too deep, too thick.
Plunger tip—too sharp or too flat.
Plunger in cylinder—presence of friction—too loose or too tight.
Groove of plunger and upper extremity of interior of cylinder—contains foreign matter and sticks.
Foot plate—radius of curvature too large or too small.
Foot plate—diameter—too large or too small.

*Under the direction of Mark J. Schoenberg, M.D., and Adolph Posner, M.D.

more specifications and methods had to be added to those used by Schiötz at the Oslo checking station. Thus, at our own station each instrument received was submitted to an examination consisting of 21 separate steps (table 1).

For brevity's sake the data obtained are summarized in figure 1 and table 1. Figure 1 indicates the various places in tonometers where defects in construction and performance were found. The de- such errors may render the instrument utterly unreliable.

The minor defects affect the accuracy of tonometers to a lesser degree, but the summation of several minor defects may constitute a major one.

Major defects. 1. The weight of the plunger load lever (hammer and pointer) unit should be 5.5 grams. An increase of one gram causes a reading toward a lower tension of one division or more on

the scale. This error is all the more considerable if the tension in a particular case happens to be in the critical zone* of the tonometric curve.

2. If the weight of the entire tonometer exceeds the specification of 16.5 gm. by several grams, it will be the source of a serious error in measurement.

3. The lever ratio, the ratio between the length of the short arm ab (4 mm.) and that of the long arm bP (80 mm.) should be 1:20. The upper extremity of the pointer (P) moves to the right 20 mm. (from 0 to 20). Thus, for each pointer deflection of one division on the scale (there are 20 divisions), the plunger makes a depression in the cornea of 0.05 of one millimeter. Any minute deviation from the ratio of 1:20 may be a source of a considerable error in the registration of the tension.

4. If the point of rotation of the lever (the joint between hammer and pointer) at the fulcrum is not stable (loose) or if the lever itself does not fit properly at that point on the fulcrum, a wobble develops during the excursion of the pointer along the tonometer scale. The pointer will then not always stop precisely at the same line, when the tonometer is applied several times in succession to the same eye, but will perform an oblique torsional movement causing a reading error of one or more divisions. This is frequently the cause of inconsistent registration on the scale.

5. If the handle is too soft, it may be pressed against the frame when placed on the eye. Hence, this pressure on the eyeball will register artificial hypertension.

6. If the radius of curvature of the testing block is greater or less than 16 mm., it does not match the curvature of the footplate, and the advantage of checking the tonometer for the zero point is lost.

7. If the edges and under surfaces of the foot plate and foot of plunger are rough, sharp, or chipped, a corneal abrasion may follow the application of the tonometer.

8. A convex undersurface of the foot of the plunger will cause an error (reading toward lower tension) by several divisions on the scale; a flat undersurface of the plunger will cause an error (toward lower tension) of about one division on the scale.

Minor defects. 1. If the scale markings are not sharp, or do not contrast adequately with the white background of the scale plate, one may experience some difficulty in reading them.

2. If the upper extremity of the pointer is too far in front of the scale, an error in reading will result due to the parallactic displacement; if the pointer is too close to the scale it may scrape against it; if too broad it will cover the dividing lines or the space between them and will interfere with correct reading.

3. If the tip of the plunger is too sharp or too flat, it is liable to produce either a deep depression or a long groove on the undersurface of the hammer, and friction will result.

4. If the diameter of the plunger is too large or too small, it will fit either too snugly or too loosely in the cylinder, respectively, and cause friction. In either case an error in registering the tension will occur.

5. If the interior of the cylinder and the surface of the plunger lack smoothness or are sticky from the presence of foreign matter the friction is increased beyond the tolerance point.

6. If too large or too small, the radius

* The critical zone on the tonometer scale is that portion which registers the borderline between "normal" and "high." Obviously, to the clinician, this is the most important part of the scale.

TABLE 1

REPORT ON 68 TONOMETERS EXAMINED AT THE CHECKING STATION* OF THE NATIONAL SOCIETY FOR THE PREVENTION OF BLINDNESS

Items Checked	Specifications, Standard with Tolerances	No. of Tonometers within Standard	Defective Tonometers					Total Tonometers Checked[a]
			Greater than	No.	Less than	No.	Total no.	
1. Weight of tonometer	16.5 gr. ± .5	45	17. gr.	7	16. gr.	12	19	64
2. Weight of plunger plus hammer, pointer, and load	5.5 gr. ± .25	13	5.75 gr.	48	5.25 gr.	4	52	65
3. Weight of load 7.5	2. gr. ± .05	45	2.05 gr.	8	1.95 gr.	10	18	63
4. Weight of load 10	4.5 gr. ± .05	44	4.55 gr.	6	4.45 gr.	14	20	64
5. Diameter of foot plate	10.1 mm. ± .1	17	10.2 mm.	12	10. mm.	38	50	67
6. Diameter of plunger	3. mm. ± .05	47	3.05 mm.	5	2.95 mm.	15	20	67
7. Radius of curvature of foot plate	15. mm. ± .5	49	15.5 mm.	7	14.5 mm.	11	18	67
8. Radius of curvature of testing block	16. mm. ± 0	13	16. mm.	12	16. mm.	41	53	66
9. Reading on 15 mm. disc	−1. mm. ± 0	17	−1. mm.	37	−1. mm.	13	50	67
10. Reading on 16 mm. block	0 ± 0	10	0	43	0	14	57	67
11. Reading on own block	0 ± 0	53	0	5	0	8	13	66
12. Lever ratio	1 to 20 ± 0	26	1 to 20[b]	29	1 to 20[c]	12	41	67
13. Radius of curvature of foot of plunger	concave	53	flat	11	convex	3	14	67

[a] Impossible to check all items on total of 68 tonometers because of missing weights and test blocks in the set, of handles, and instruments out of alignment.
[b] Higher ratio indicates reading is too soft.
[c] Lower ratio indicates reading is too hard.

Additional items recently added to the procedure of checking:

14. Condition of division lines on scale (blurred, too thick)
15. Distance of pointer from scale (too far, too close)
16. Shape of pointer (bent, too broad or thick)
17. Presence of friction between plunger and cylinder
18. Condition of lever (wobble)
19. Condition of plunger (loose, edge chipped or sharp)
20. Condition of foot plate (edge chipped or sharp)
21. Condition of groove of plunger and interior of cylinder (presence of foreign matter)

* Under the direction of Adolph Posner, M.D., and Mark J. Schoenberg, M.D.
These specifications have been adopted by the Committee on Standardization (Dr. Jonas Friedenwald, chairman) with some slight modification. A paper on the subject will be published in the near future.

of curvature of the foot plate will impair the correct adjustment on the testing block.

7. The diameter of the foot plate, if too large or too small, will cause inaccurate reading because it changes the weight resting on the unit area of the cornea.

Remarks. The first two columns in this table present the lists of the items to be checked in tonometers and the standard Schiötz specification for each item. The remaining columns give the number of tonometers in which each of the specifications was found to be correct or defective.

The discovery of the same defects in a large percentage of the tonometers examined to date leads us to believe that these instruments are fairly representative of the general run of defective tonometers. These instruments were sent to the New York checking station by ophthalmologists in 17 different states* and Canada.

A glance at the table reveals the following figures regarding a few of the major defects found in the group of tonometers examined:

1. The weight of plunger, load, and lever is either too high or too low in 52 out of 65 tonometers (80 percent).

2. The weight of the entire tonometer is not according to standard in 19 out of 64 (29 percent).

3. The radius of curvature of the test-

* The following is the list of the states from which tonometers were sent to the New York checking station: California, Connecticut, Georgia, Illinois, Indiana, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, Nebraska, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Utah.

ing block is not according to the standard in 53 out of 66 (80 percent).

4. The lever ratio is defective in 41 out of 67 (61 percent).

Conclusions

The following conclusions seem inescapable:

1. A large percentage of tonometers (Schiötz type†) contains defects of construction and of performance. These defects point to one of the two reasons for the unreliability of many tonometers.‡

2. Every tonometer already in use should be checked at a reliable checking station at the earliest possible time.

3. Inaccurate tonometers should not be used until the important defects are corrected or adjusted.

4. It is urgent that a number of reliable checking stations be established under the direction of ophthalmologists in appropriate locations, throughout this country.

5. It is important that precision mechanics be found who are able to put defective tonometers in good working order.

6. Manufacturers of tonometers should be urged to have their instruments checked and certified at reliable checking stations before placing them on the market.

667 Madison Avenue.

† No one knows how many of the other types are defective.
‡ The other reason is defective technique of tonometry.

OPTIC-NERVE ATROPHY IN MALIGNANT NASOPHARYNGEAL TUMORS

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Malignant nasopharyngeal tumors are of interest to the ophthalmologist because of the involvement of the ocular nerves. Involvement of the optic nerve is of special interest because of its infrequent occurrence.

The pathologic study made on the second of the two cases here reported has clarified and opened the way to a better understanding of the first case, which has not come to autopsy.

CASE REPORTS

Case 1. T. R., 30 years old, a white housewife, was referred to the Eye Clinic of the University of Illinois Research Hospital by the Ear, Nose, and Throat Clinic on July 23, 1941, because of a paresis of the right external-rectus muscle and right optic-nerve atrophy. She stated that about a year before she had consulted a physician because of a sore throat and sinus infection; she also complained then of a headache on the right side which began at the bridge of the nose and radiated to the right temporal region. A few months later she developed a diplopia.

The Ear, Nose and Throat Department's report was as follows: "The septum was pushed to the left, showing a pinkish tumor in the epipharynx with an irregular surface resembling adenoids. Hearing was diminished on the right side. X-ray study showed an increased density over the sphenoid sinus (fig. 1), and the sellar outlines were blurred. A biopsy specimen from the epipharyngeal tumor, removed on August 1, 1941, revealed a transitional-cell carcinoma.

The Wassermann test was negative. Blood count: Red blood corpuscles 3,500,000; white blood corpuscles 6,500; hemoglobin 65 percent. The neurologic examination on August 9, 1941, showed a paresis of the right sixth nerve and hypalgesia of the right side of the face.

Examination of the eyes on August 12, 1941, showed vision R.E. was 5/200;

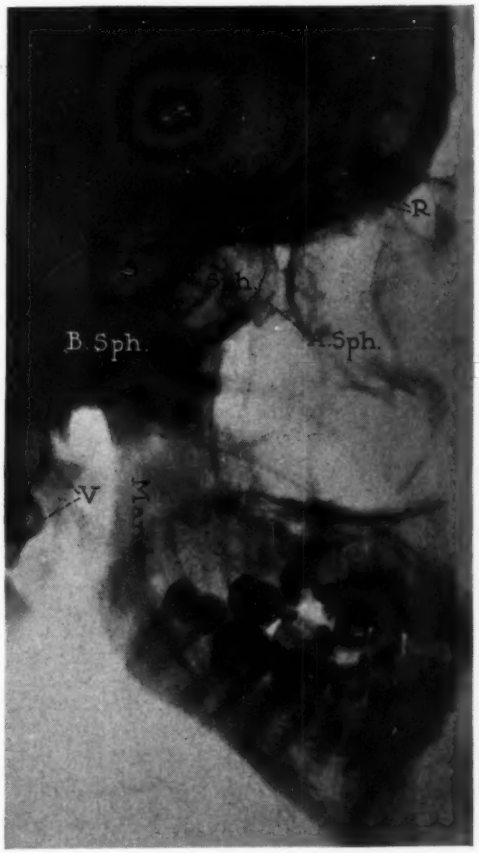

Fig. 1 (Folk). X-ray study of case 1. Sph., sphenoid cloudy due to tumor invasion. Note the absence of tumor within the epipharynx. R, roof of the orbit; S, sella turcica; B.Sph., body of sphenoid; V, vertebrae; Mand., mandible; A.Sph., anterior wall of sphenoid.

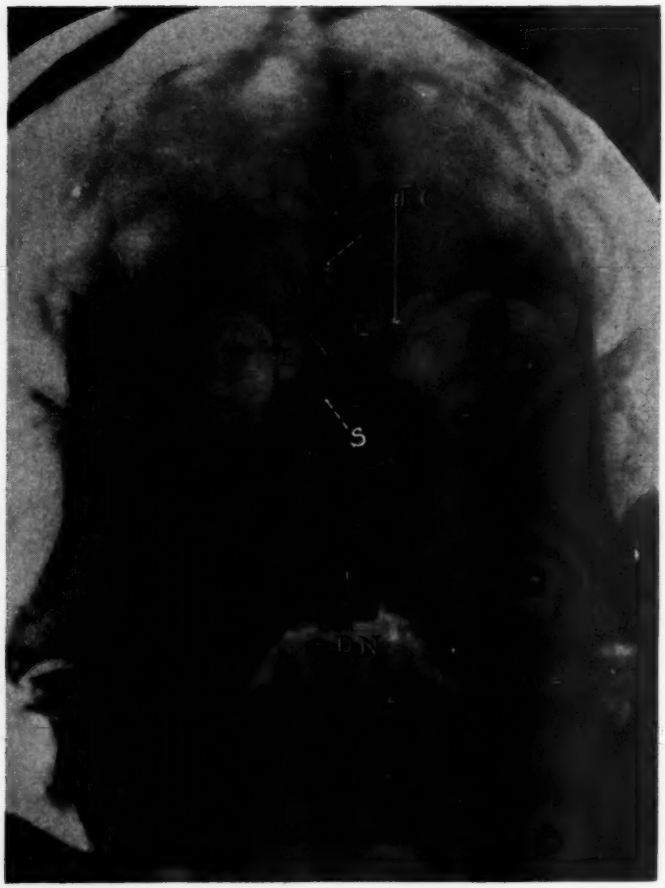

Fig. 2 (Folk). Case 2. F.C., falx cerebri calcified; C.G., crista galli; E, ethmoid; S, nasal septum; D.N., diastasis between the two alveolar processes of maxilla.

L.E. 20/20. There was a slight ptosis of the right lid. Some esotropia for distance and esophoria for near was present. There was a weakness of the right external-rectus muscle. The candle-light test showed a homonymous diplopia which increased when the eyes turned to the right. The irides were brown. The pupil of the right eye did not react to direct light but did react consensually. The pupil of the left eye reacted normally. The disc of the right eye was pale, its margins were clearly outlined, and the blood vessels slightly narrowed. The rest of the fundus was normal. The visual field of this eye showed a concentric contraction of 20 degrees and a complete loss of red and green fields. The intraocular pressure was normal.

Patient was given 10,000 r in 40 sessions. Under this treatment the growth disappeared from the nasopharynx. The eyes became parallel and there was some improvement of vision in the right eye from 5/200 to 20/200. However, the neuralgia of the right side, the headache, and the wasting of the body continued.

Case 2. C. P., five years old, a white girl, had been a full-term baby, well except for measles in April, 1940, and occasional colds. In December, 1941, she developed a stuffiness of the nose. A physician was consulted, and he found a growth in the nose which he considered to be nasal polyps. He tried to remove them by applying trichloracetic acid. The child immediately lost consciousness for

Fig. 3 (Folk). Case 2. D, enlarged diploic veins; S, sella turcica; T, tumor; A.Sph., anterior wall of sphenoid; R, roof of orbit; Mand., mandible.

45 minutes. That evening the girl's right cheek and upper lid began to swell and her eyes to water. Shortly after this she began to complain of dimness of vision. According to the history reported by the parents, the swelling of the lids receded but the vision became progressively worse. The child grew exceedingly apprehensive and irritable. She began to have great difficulty in breathing. Because of the apparently complete obstruction of the nose a rhinologist decided to remove the growth, but immediately after receiving the anesthetic the child stopped breathing and was revived with difficulty. No surgery was performed. About three days after this the right lid began to droop, both eyes teared and began to

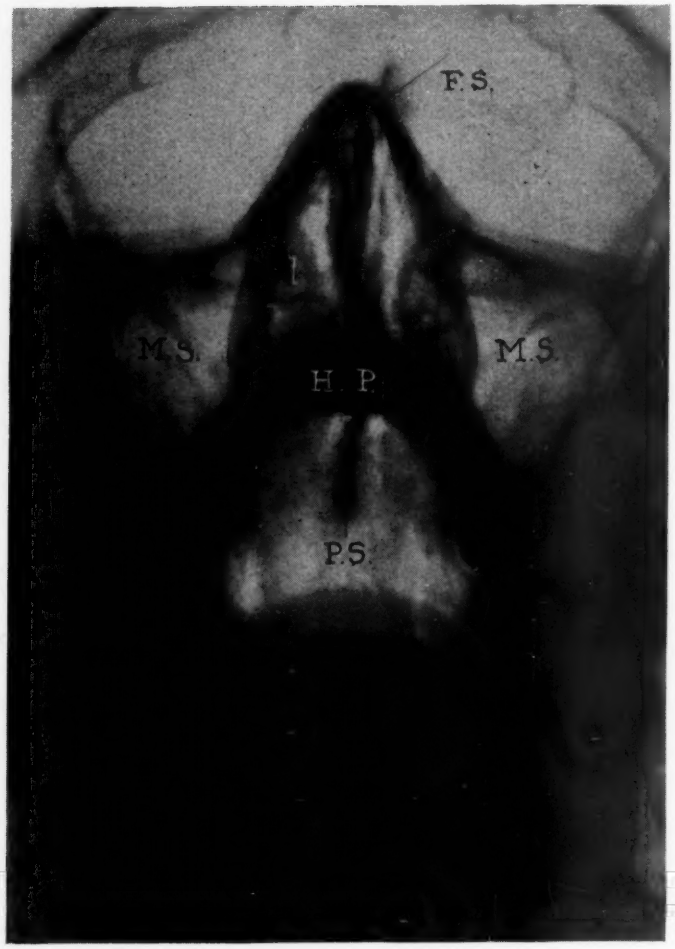

Fig. 4 (Folk). Case 2. F.S., frontal sinus; S, nasal septum; M.S., maxillary sinus; H.P., hard palate; Note the cloudy structure in the area of the posterior ethmoid and sphenoid due to invasion of tumor.

bulge. Her vision decreased to the point where the child could not recognize her parents, and her fearfulness increased.

On admission to the Pediatric Department of the University of Illinois on March 9, 1942, the child was extremely apprehensive and kept her eyes closed as if she had photophobia. In the nose, a tumor extended into the epipharynx and pushed the nasal septum to the right side. X-ray studies showed an increased density over both maxillary sinuses and some of the left ethmoid cells (figs. 2 and 4). There was a complete absence of intranasal bony structure. The blood channels over the anterior part of her skull were unusually prominent and the intermaxillary suture was open (fig. 3).

The eye findings on March 10th revealed a moderate proptosis of the right eye and slight proptosis of the left eye. Vision could not be taken because of poor coöperation. There was a mild suppurative dacryocystitis on the right side. The pupils were 6 mm. in diameter and reacted poorly to light, but the eyegrounds appeared normal.

On March 17th, the proptosis on the left side was marked. Both pupils were dilated to 6 mm. and neither reacted to

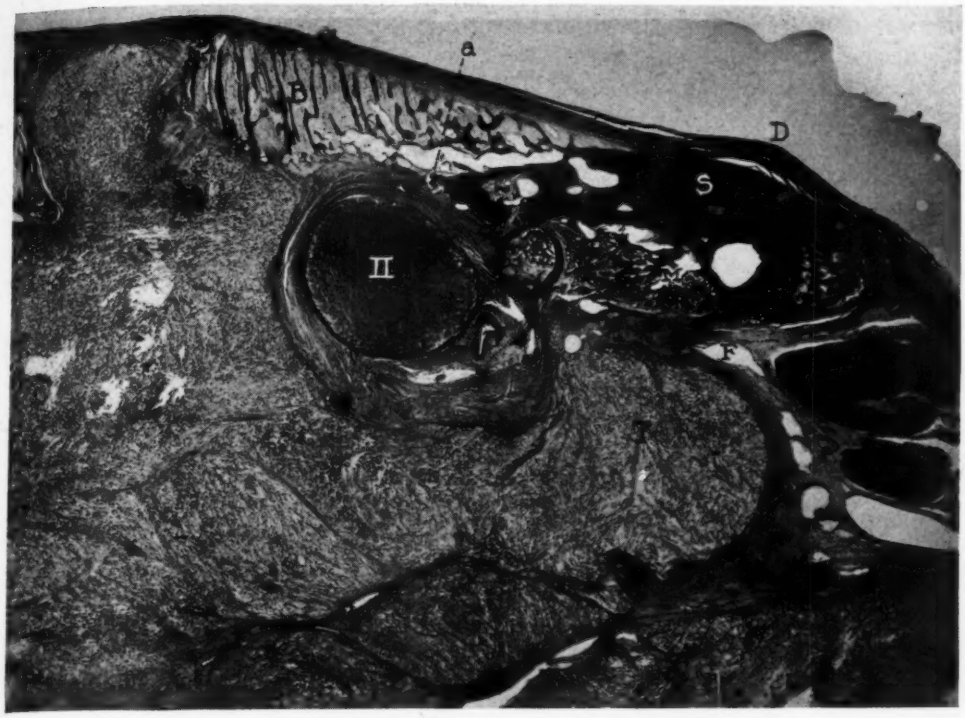

Fig. 5 (Folk). Case 2. Frontal section through the sphenoid field within tumor masses. T, tumor; II, optic nerve; F, superior orbital fissure; B, newly formed bone; S, small wing of sphenoid; D, dura; a, indicates an erosion of the small wing of sphenoid.

light. There were a complete external ophthalmoplegia, and a ptosis on the right side; the palpebral fissure was narrowed to a slit and apparently there was complete blindness. Wassermann and Kahn tests were negative.

On March 25th the child died.

The autopsy revealed a proptosis of both eyes. The nasal septum was deviated to the right. The calvarium was thin and on its inner aspect near the vertex there were two rounded-out depressions. The dura was elevated uniformly throughout the region of the cribiform plate, the planum sphenoidale, and the region of the sella turcica. The dura was not perforated. All of the paranasal sinuses were obliterated by a white, boggy tumor mass which had destroyed the bone and cartilage but was limited by the mucous membrane lining the sinuses. The lacrimal bone on the right side was partially preserved (fig. 3).

Microscopic examination

Palate: The tumor was extremely cellular, containing for the most part spindle cells. It was separated from the glandular layer on the oral surface of the soft palate. The bone of the hard palate was separated from the tumor but showed marked osteosclerosis and less-marked osteogenesis due to pressure of the new growth.

Hypophysis: The largest part of the section consisted of a tumor mass which replaced the entire body of the sphenoid and reached the dura in the region of the anterior clinoid process but did not perforate the dura at any place. In the

region of the posterior clinoid process the tumor was distinctly separated from the very active red marrow of the clinoid process. The synchondrosis spheno-occipitalis was reduced to a very narrow layer of cartilage which was eroded but not perforated by the tumor. The hypophysis was pressed against the posterior clinoid process. The new growth consisted of pleomorphic cells and many giant cells. Spindle cells were also seen but in fewer numbers. The diagnosis of the tumor was *spindle-cell sarcoma.*

Optic nerve: The tumor contained parts of the intersphenoidal synchondrosis and remnants of the mucous membrane of the sphenoid. Toward the dura the tumor was covered with various tissues. In the area of the planum sphenoidale the dura was markedly thickened and between the layers of the dura a layer of new bone was formed (fig. 5). The new bone consisted of atrophic trabecula which were lying fairly parallel and extended toward the internal layer of the dura in a right or acute angle. There was loose connective tissue between these trabecula but the connective tissues did not present infiltration. In other places the tumor perforated the outer layer of the dura and the newly formed bone reached the inner sheath of the dura, which was not perforated at any place.

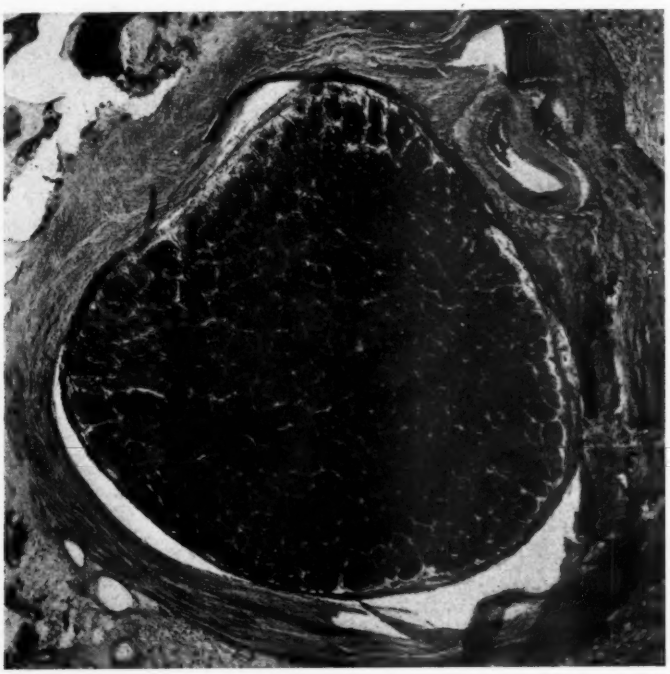

Fig. 6 (Folk). Case 2. Weigert stain of optic nerve.

Laterally, the tumor surrounded the optic nerves but in no place did it perforate the dural sheath (fig. 6). The ophthalmic arteries on both sides were normal. While the tumor did not perforate the periosteum, it apparently pressed the optic nerve toward the lesser wing of the sphenoid which separated the optic canal from the superior orbital fissure, the lesser wing of the sphenoid being thereby destroyed in that area of

pressure. The tumor advanced toward the superior orbital fissure but did not penetrate the periosteum of the orbit.

Comment

In case 1, the typical clinical picture of a carcinoma of the epipharynx was presented. Inasmuch as the symptomatology and pathology of these cases are very well known, an exhaustive discussion of the laryngologic and neurologic background of the cases is omitted. Attention is called, however, to the optic atrophy in the case, for a study of the literature proves that optic atrophy is not frequently encountered in cases of malignancies of the epipharynx.

TABLE 1

Nerves affected in cases of nasopharyngeal tumor

Author	No. of Cases	Cranial Nerves				
		II	III	IV	V	VI
Oppikofer[1]	21	1	1	2	17	4
Schlivek Kaufman[2]	38	1	2	2	12	8
Woltman[3]	25	5	4	4	2	18
Hansel[4]	9	3	4		4	6
Brunner[5]	15	2	4	1	9	5
Totals	108	12	15	9	44	41

The figures in table 1 are only approximations. This is due to the fact that (1) not all cases were observed for a sufficient length of time for them to acquire symptoms of disease of the optic nerve and other eye-muscle nerves which appear in the late stages of the disease, and (2) only certain types of tumors have a tendency to destroy bones and involve the ocular nerves.

The question arises as to how the involvement of the optic nerve can be explained in cases of epipharyngeal malignancies. Several years ago Jacob[6] pointed out that epipharyngeal tumors may grow along the eustachian tube into the skull and advance along the great wing of the sphenoid toward the optic canal and involve the opticus in that way.

In case 2 it is shown that the optic nerve might be involved in another manner. Here a very malignant sarcoma invaded both sphenoid sinuses and after destroying the lateral wall of these sinuses penetrated the optic canal so that the optic nerve was almost completely surrounded by tumor tissue. The tumor then advanced toward the superior orbital fissure. It is interesting to note that the periosteum of the orbit was not perforated by the tumor so that neither the contents of the orbit nor the contents of the superior orbital fissure were infiltrated by tumor tissue. The periosteum of the orbit was pushed forward, inducing the proptosis observed in this case.

Most interesting are the findings concerning the optic nerve. As already mentioned, it was almost entirely surrounded by tumor tissue. Only the roof of the optic canal, which belongs to the anterior fossa of the skull, was still present, although pathologically changed. It should be pointed out that neither the dural sheath of the optic nerve nor the dura of the anterior cranial fossa was perforated at any place; hence there was no sarcomatous infiltration within the optic nerve.

The microscopic findings showed that the optic nerve in this case could be

easily damaged by pressure of the tumor toward the roof of the optic canal and not by sarcomatous infiltration, if the nerve were to be impaired at all.

Whether or not the optic nerve in case 2 was functioning, cannot be definitely stated. I can only report that the nerve when stained with Weigert's solution, which stains the myelin sheath but not the axis cylinders of the nerves, presented normal myelin sheaths. However, this observation must be carefully evaluated because the child died shortly after the onset of symptoms. It is possible that in spite of what was indicated by Weigert's technique, the osmium technique of Marchi would have indicated a degeneration of the myelin sheath. Unfortunately, neither the method of Marchi nor the silver method for impregnation of the axis cylinders could be employed as the condition of the specimen did not permit it. It is, therefore, not possible to state that the optic nerve was entirely normal.

At any rate, case 2 proves that the optic nerve might be involved by perforation of the lateral wall of the sphenoid sinus by a malignant tumor within the sphenoid sinus. As case 1 presents a definite involvement of the sphenoid sinus, proved by the X-ray picture, it is obvious that the optic atrophy in this case can be explained as due to the same conditions that obtained in case 2, as revealed by the microscopic findings.

Conclusions

1. Involvement of the optic nerve in malignant tumors of the epipharynx is not frequent.

2. The optic atrophy in the cases herein described is preceded by invasion of the epipharyngeal tumor into the sphenoid sinus. This fact explains why the appearance of the optic atrophy is late.

3. From the sphenoid sinus the malignant tumor may invade the optic nerve after perforating the lateral wall of the sphenoid sinus.

4. The dural sheath of the optic nerve as well as the periosteum of the orbit and the dura is more resistant to aggression by the tumor than is bone tissue. This holds true for sarcoma.

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HYPERPYREXIA IN THE TREATMENT OF ACUTE OCULAR INFLAMMATIONS*

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The treatment of acute inflammatory diseases of the eye has resolved itself into three phases: 1. Standard ophthalmologic management, including local therapy and chemotherapy. 2. The location and elimination of infectious foci. 3. Pyretotherapy, which usually consists in giving the patient frequent injections of some pyretogenic agent, usually a foreign protein (typhoid vaccine or sterile milk). In most cases the mild febrile response obtained, usually less than 104 degrees and of short duration, is insufficient to give any material benefit in severe cases. Only a few patients are given the benefit of the intensive and prolonged therapeutic fever that is obtained with the hypertherm.

The usefulness of the more intensive pyretotherapy cannot be overestimated. It is the belief of the writers that much visual loss could be prevented, and much intense suffering rapidly alleviated, by vigorous application of this type of treatment. It is far more generally available than is commonly realized, since most clinical centers possess some type of fever cabinet employing either the Kettering or a similar principle.

A group of 51 cases of *nonsyphilitic* inflammatory diseases of the eye has been reviewed to demonstrate the striking effectiveness of this method of treatment. These were all cases of severe inflammatory diseases, the prognosis of which was grave had the treatment been confined to routine measures only. In most of these cases foreign-protein-shock therapy and thorough local therapy had previously been used without arrest of the progress of the disease. Some of the cases were referred to the Department of Fever Therapy by the Department of Ophthalmology of this hospital, the rest were sent by prominent ophthalmologists of this city. It is recognized that many of the patients would have recovered partial vision eventually under other forms of treatment, but the rapid relief of pain and the dramatic speed of recovery with the hypertherm suggest that an appreciable percentage of vision was saved in these patients, many of whom were restored to perfect vision.

Treatments were all given in fever cabinets which use the Kettering principle of hyperpyrexia. The lower level of therapeutic fever is considered to be 104°F., and most treatments are maintained above that level for five hours. The exact level of temperature used depends upon the condition to be treated and the physical condition of the patient. Almost all patients are able to take a five-hour treatment at 105 degrees, which is the usual level for eye conditions. Gonococcal infections require a temperature of 106-107°F., with longer treatments preferred, and the concurrent use of sulfathiazole is suggested.

Treatments are given at intervals of three to five days for as long as is deemed necessary. When these treatments were first used in ocular diseases, we were happy to get relief of pain and arrest of the progress of the disease in the eye. It was felt that the matter of plastic exudates, vitreous opacities, posterior synechiae and such conditions were in the hands of the ophthalmologists. It became evident, as earlier cases were reviewed, that those patients who had more treat-

*From the United States Public Health Service.

ment had less residual damage, even though they had been apparently hopeless at the beginning. Now treatments are continued, unless the patient's physical condition prevents it, until all improvement has stopped. This is an important observation. It must not be construed as meaning that cases with old, long-standing opacities of the vitreous, old posterior synechiae, or old severe conjunctival scarring will benefit from any amount of fever therapy. It is only when such conditions are in process of formation and are still plastic that absorption can be obtained. The logical conclusion from this is that the more severe inflammatory conditions of the eye should be treated in the hypertherm at the very beginning of therapy. Early recognition of those cases requiring hypertherm treatment depends upon the alertness of the attending ophthalmologist and his understanding of the value of this treatment in these cases.

Table 1 lists by diagnosis the diseases treated in this series of cases, showing the results of treatment in each group. In cases listed as having *"excellent results"* there was practically no loss of vision. In cases listed as *"satisfactory results"* there was marked symptomatic improvement but some residual visual impairment; in those listed as *"improved"* there was arrest of the progress of the disease and relief of the acute symptoms but no visual improvement. Cases listed as *"failures"* resulted in no symptomatic relief or visual improvement. In cases listed as *"relapses"* there was variable early improvement which did not persist.

There is a total of 37 patients in whom there were excellent and satisfactory results and whose vision has been restored to normal limits. These may be considered as cured by the treatment. The duration of the disease before the inauguration of fever therapy and the number of treatments given are the two factors which seem to govern the difference between excellent and satisfactory results. It is gratifying to realize that a large proportion of these patients would have been partially or totally blind in the absence of pyreto-

TABLE 1

DISEASES TREATED BY PYRETOTHERAPY AND RESULTS

Diagnosis	No. Cases Treated	Results of Treatment				
		Excell.	Satis.	Improv.	Fail.	Relapse
Herpes zoster ophthalmicus	4	4	—	—	—	—
Neuromyelitis optica	1	—	1	—	—	—
Iritis, acute	9	5	3	—	1	—
Sympathetic ophthalmia	1	1	—	—	—	1
Panophthalmitis	2	—	—	1	1	—
Retinitis, chronic	2	—	1	—	1	—
Corneal ulcer	7	4	1	1	—	1
Foreign body or trauma	3	—	—	2	1	—
Optic neuritis	2	—	1	1	—	—
Iridocyclitis	4	4	—	—	—	—
Ulcerative keratitis	2	2	—	—	—	—
Traumatic keratitis	2	—	—	—	—	2
Acute exudative choroiditis	6	2	3	—	1	—
Interstitial keratitis (nonspecific)	1	1	—	—	—	—
Gonococcal infections:						
(a) Acute conjunctivitis & corneal ulcer	4	—	2	2	—	—
(b) Ophthalmia & iritis	2	2	—	—	—	—
Total	52	25	12	7	5	4

TABLE 2

DATA ON 10 CASES OF OCULAR INFLAMMATION TREATED WITH PYRETOTHERAPY

Patient	Diagnosis	Initial Vision		Signs in Eye										Pain	No. of days previous treatment	Fever Treatments			Results		Final Vision		Remarks
		Left	Right	Conjunctivitis	Corneal Ulcer	Cornea Perforated	Aqueous Flare	Hypopyon	Synechiae	Vitreous Opacity	Edema—Nerve Head	Retinitis	Keratitis			No. of treatments	Total hours	Temperature range	Relief of pain	Clearing of signs	Left	Right	
M.M.	Keratitis, interstitial (nonspecific)	L.P.	L.P.	2+	0	0	4+	2+	1+	0	0	0	3+	3+	21	16	80	104–106	Prompt, total	Began after 5th R	20/50	20/40	Free of symptoms for 1 year; now corrects to 20/20 both eyes
A.E.	Choroiditis, acute, exudative	5/200	20/20	0	0	0	1+	0	2+	2+	0	0	0	3+	26	5	25	104–106	Prompt, total	Rapid	20/20	20/20	Check after 2 years showed vision same. This patient had no results from routine treatment
J.P.	Iritis, acute left	0	20/20	3+	0	0	1+	0	2+	2+	0	0	0	4+	9	5	29	105–106	Prompt, total	Rapid	20/60	20/20	Few vitreous opacities remain
M.H.	Ulcerative keratitis, left	20/200	20/20	4+	2+	0	2+	0	0	0	0	0	0	3+	15	3	15	104–105	Prompt, total	Rapid	20/60	20/20	Should have had more treatment
R.C.	Neuro-myelitis optica	L.P.	8/200	0	0	0	0	0	0	0	3+	0	0	4+	28	8	38	105–106	Prompt, total	Rapid	20/130	20/120	Corrects to L = 20/50; R = 20/50. Unchanged in 8 months
F.Y.	Herpes zoster	20/20	Slight haze	2+	2+	0	0	0	0	0	0	0	0	4+	14	3	15	105–106	Prompt, total	Healing after 3rd R	20/20	20/20	Severe supraorbital herpes with corneal ulceration
B.C.	Iridocyclitis, bilateral	20/200	20/120	3+	0	0	1+	0	2+	3+	0	0	0	4+	62	4	20	104–105	Prompt, total	Rapid	20/60	20/50	Corrected to 20/40 both eyes. Severe dental infection was probable focus
C.L.	Gonnorrheal ophthalmia, bilateral	L.P.	L.P.	4+	1+	0	2+	0	1+	0	0	0	0	3+	6	9	45	106–107	Gradual, total	Rapid after 4th R	20/20	20/20	Sulfathiazol not used—(results are better with addition of sulfathiazol)
R.F.P.	Corneal ulcer, serpentine	L.P.	20/20	4+	3+	0	0	0	0	0	0	0	0	4+	40	4	20	105–106	Prompt, total	Rapid	20/60	20/20	Pain was outstanding feature here; relieved by 1 treatment Minimal residual scarring
L.H.	Gon. iritis, left	L.P.	20/20	3+	0	0	3+	0	0	1+	0	0	0	4+	4	4	20	105–106.8	Prompt, total	Rapid	20/20–3	20/20	Early treatment plus sulfathiazol gave excellent results

TABLE 3

IMPROVED: SYMPTOMATIC RELIEF, AND ARREST OF PROCESS, WITHOUT IMPROVEMENT OF VISION

Diagnosis	Prognosis at Start of Treatment	Number of Treatments Given	Response to Treatment	Remarks
Gon. ulcer of cornea	Poor	2	Relief of pain and arrest of gonorrhea	Treatment stopped because pt. noncoöperative. More treatment would have helped this case
Gon. ulcer of cornea	Hopeless	3	Relief of pain and arrest of gonorrhea	Eye was almost destroyed before treatment started. Enucleation done
Optic neuritis complication of cataract operation	Fair	4	Neuritis was checked, no visual improvement	Loss of vision was gradual but unchecked until fever therapy
Foreign body; Postop. infection of stump after enucleation	Poor	7	Relief of pain before enucleation and rapid improvement of postop. infection	Aside from relief of pain, the most benefit was in treatment of dangerous infection of stump
Traumatic degeneration and infiltration, left eye with blindness	Hopeless, cnucleation indicated	2	Some relief of pain obtained	Palliative relief the only object here
Panophthalmitis (occurring in blind eye due to old serpiginous ulcer)	Hopeless	2	Immediate relief of pain and inflammation	Enucleation of blind eye greatly facilitated by relief of inflammation
Recurrent corneal ulcer (Leucoma of cornea)	Hopeless due to leucoma	5	Complete, immediate relief of pain; healing of ulcer	Since fever treatment has no benefit on preëxisting scar tissue, the leucoma was unaffected. Further scarring is often prevented in such cases

therapy, and that the remainder would have had serious visual impairment in one or both eyes.

It is impractical, with the number of cases reviewed, to present case reports of all the cases. However, table 2 shows a detailed summarization of 10 typical cases in the excellent or satisfactory groups, selected because they demonstrated the usual response, rather than because they show successful results.

For comparison with the good results demonstrated in table 2, *all* of the unsatisfactory results are reviewed in tables 3 and 4.

Thus we are able to observe that of the 12 cases in which there were more or less unsatisfactory results, the prognosis in 8 was poor or hopeless at the outset. Of the remaining four, two patients refused further treatment. This leaves two patients with good or fair prognosis, of whom one received some benefit and was classed as improved, and one received no benefit at all because there was no particular indication for this type of treatment in that case. The relief of pain in many of these "unsatisfactory" cases not only justifies the treatment but is an immediate benefit not to be disregarded.

It should be noted that of the group of "Relapsed" cases, one patient was

physically unable to continue the treatments, two had ultimate recoveries despite relapses, and one had a relapse related to insufficient treatments, but his final vision was still much improved. Failure to eliminate infectious foci is a great contributory factor in these relapses.

This discussion of the cases not responding to treatment with more than

TABLE 4

FAILED, NO VISUAL IMPROVEMENT OR RELIEF OF SYMPTOMS

Diagnosis	Prognosis at Start of Treatment	Number of Treatments Given	Response to Treatment	Remarks
Iritis, acute	Good	1	0	Patient too frightened to coöperate
Panophthalmitis	Poor	8	Slight relief of pain	Treatment given at too low temperatures for good results. Less than 104°F.
Retinitis, chronic	Poor	10	0	No benefit obtained which could be attributed to fever
Laceration of eyeball	Good	1	0	No reason for using fever in this type of case
Choroiditis, acute exudative	Good	1	Some relief of pain	Patient refused further treatment and left hospital

symptomatic improvement bears out the statement made previously that results with fever therapy depend upon early and thorough treatment. If destruction has already occurred the hypertherm can do no more than arrest the progress of the disease. If inadequate treatment is given, the maximum benefit cannot be obtained. In additon to this it is also important that adequate attention be given to infectious foci which may be the cause of, or contributing to, the disease process.

Much has been said of "relief of symptoms" without any specific statement as to the type of symptomatic relief afforded. The chief symptoms benefited by fever therapy in the above conditions are: (1) Pain in the affected eye. (2) Diminution or loss of vision. (3) Photophobia. (4) Lacrimation. (5) Headache.

All of these symptoms are improved by fever treatment. The most dramatic relief afforded is the elimination of pain, usually effected by the first treatment. Lacrimation is also relieved, usually by the first treatment. Headaches and photophobia are next relieved, often by the first treatment, usually by the second or third. The response of vision is varied, and accounts for the reason the treatment was stopped after too short a course in some of the earlier cases. Many patients have rapid visual improvement with the relief of the symptoms of pain and photophobia. Those cases, however, in which there is a plastic exudate, interstitial keratitis, or opacities of the vitreous often do not respond at all, as far as vision is concerned, for several treatments. After the fourth or fifth treatment these cases suddenly begin to clear, and with persistence of the treatment the exudate is absorbed. Absorption may be almost complete if treatment is kept up; if not, some visual defect may remain. The rule is, therefore,

to persist in the treatments, if the patient can tolerate them, for as long as any sign of improvement is present.

The relief of symptoms is accompanied by relief of signs observed by the examiner, as has been mentioned. These signs, as listed below, are somewhat varied, and, of course, not all related to the same diagnosis: Conjunctivitis. Ulceration of conjunctiva or of cornea. Scarring of cornea. Plastic exudate in the anterior chamber. Hypopyon. Posterior synechia. Inflammation of the uveal tract. Vitreous opacities. Retinitis. Edema of the optic nerve.

Relief of conjunctivitis is rapid. Healing of ulcers is rapid if they are superficial. If deep, the healing depends on the duration, and whether they penetrate into the anterior chamber. If relatively recent and uncomplicated, comparatively rapid healing will occur, with no progress or complications of the ulcer other than scarring. Scarring of the cornea is benefited only in a prophylactic way. Fever therapy in corneal ulcers prevents any more than minimal scarring. Plastic exudate in the anterior chamber, after two or three treatments, is absorbed with amazing rapidity and thoroughness, leaving no residuals in most cases. Relief of posterior synechia depends upon the factors of early treatment and thoroughness, not

TABLE 5

RELAPSE AFTER PYRETOTHERAPY

Diagnosis	Prognosis	No. of Treatments	Response
Sympathetic ophthalmia, Rt. eye. L. eye previously enucleated following iridocyclitis	Poor, vision 20/200	21	Vision returned to 20/30 after ninth treatment but tended to relapse. Further treatment given to prevent relapse. Vision on discharge 20/40. Relapse in three months and patient returned for more treatment
Same case as above	Fair, vision 20/80	10	Vision returned to 20/40 and all symptoms again subsided. Vision will correct to 20/20, and remained unchanged when checked again in six months. Although listed under *relapse*, the final results were excellent.
Keratitis, traumatic	Guarded, vision 20/120	3	Relief of pain after each treatment, symptoms subsided but relapsed in 10 months. Patient did not have enough treatment according to present knowledge. Patient failed to have infectious foci removed as advised. Final vision 20/40
Keratitis, traumatic	Guarded, vision 20/200	7	Preëxisting central corneal opacity of four years' duration. The acute process was arrested by fever treatment with immediate relief of severe pain. Patient developed mild relapse one month after treatment. Handled by local treatment. Final vision 20/40. Patient failed to have infectious foci removed as advised
Corneal ulcer (duration 13 months)	Guarded	1	Physical condition of patient prevented more than one treatment. Ulcer healed slowly under local treatment and recurred in six months. Not enough treatment to evaluate results

only of the fever therapy, but also of the local treatment in the eye. If well handled, excellent results are usually obtained. Inflammation of the uveal tract obtains almost unfailingly excellent end-results, in spite of surprisingly bad cases on admission in some instances. Vitreous opacities, if quite recent, will absorb; but, even when only of moderate duration, are somewhat resistant to treatment. There have not been enough cases presenting retinitis to gain much impression of results. What impression exists is not promising. Edema of the optic nerve subsides relatively rapidly. Since affections of the optic nerve are mostly syphilitic, this sign does not enter into this series, particularly.

Careful handling of these cases by the ophthalmologist is necessary. The usual local treatment measures are continued assiduously, even while the patient is in the cabinet. It is superfluous to enumerate here the various local measures necessary in the care of the eye diseases listed. It is important to stress, however, that these measures must be carried out until healing is complete just as if the patient were not being handled with fever therapy. The purpose of fever therapy is to supplement the standard treatment measures, not to supersede them. The physician in charge of fever therapy and the ophthalmologist must work in constant consultation in almost all of these cases. In this way it is possible to determine the frequency of the treatments necessary, the level of temperature desired, the duration of each treatment, and finally the point at which treatment can be terminated.

It should be emphasized that the danger of this method of treatment is negligible in trained hands, and in this series there were no complications of treatment other than a few cases of mild herpes labialis after the first treatment, which disappeared after subsequent treatments.

Summary

1. The use of fever therapy by means of the hypertherm cabinet in the treatment of various acute inflammatory diseases of the eye (excluding syphilis) has been discussed. 2. Fifty-two consecutive and unselected cases of various inflammatory diseases of the eye treated in the hypertherm have been grouped by diagnosis and the results examined. 3. Excellent results were obtained in 25 cases, and satisfactory results in 12 cases, giving a total of 37 patients classed as cured. 4. The results in the remaining cases were: Improvement, 7; failure, 5; relapse, 4. These relatively unsatisfactory cases were discussed and certain conclusions obtained. 5. The specific effect of treatment in the relief of the various signs and symptoms was shown to be uniformly good.

Conclusions

1. The results of pyretotherapy in the treatment of inflammatory diseases of the eye are excellent in many cases, offering the only means of saving partial or total vision.

2. The most striking immediate result of treatment is *relief of pain*. The restoration of vision is slightly more delayed, but very remarkable in most cases, depending on three factors: (a) the duration of the process before the start of fever therapy; (b) the number of treatments given while under the therapeutic regime; (c) the close coöperation of the ophthalmologist, first in persisting in the local treatment, and second in determining the point at which treatment is to be discontinued.

3. It is evident that much vision may be saved by this method of therapy, and

equally evident that it is not applied as much as possible even where it is available. It is desirable, therefore, that ophthalmologists become more aware of the usefulness of this therapeutic method, and ascertain the means at hand in their locality whereby they may make it rapidly available to selected patients.

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JUVENILE CATARACT IN ASSOCIATION WITH DERMATOSIS*

(CATARACTA SYNDERMATOTICA)

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From the time that Rothmund[1] in 1868 described the occurrence of juvenile cataracts associated with a peculiar skin degeneration in a family of two brothers who married two sisters, the interest of the medical profession was aroused. So far 37 cases have been reported in English and European literature. Of these, 15 were published in America, 20 in Europe, 1 in Australia, and 1 in England.

Evidently they are not frequent, and the purpose of this paper is not only to present another case but to bring out the characteristics of this unusual disease that affects the skin and the lens.

The outstanding symptoms of the disease are marked generally but not universally by:

1. Endocrine disturbances[2]
2. Skin pathology diagnosed as
   a) Scleroderma
   b) Neurodermatitis
3. Lens pathology

Of the endocrine-gland disturbances the most prominent are: Infantilism, poor body growth, premature graying of hair, underdevelopment of sex organs, and abnormal basal metabolism. Of the endocrine glands involved, the most common are thyroid, parathyroid, testicular and ovarian glands, although undeniably some of the cases show evidence of pluriglandular disturbance.

As seen from the cases reported in the literature, endocrine disturbances were observed 16 times, graying of hair in 8 cases, scleroderma in about 55 percent of cases, and neurodermatitis in 45 percent.

One must be particularly careful to differentiate the juvenile type of cataract known as cataracta syndermatotica, from the cases of cataract occurring in association with hypofunction of the parathyroid gland. The term *syndermatogenous cataract* was suggested by Kugelberg[3] in 1934, because the cataractous lens changes occur in association with abnormal skin changes.

It is well known that in endocrine disturbances such as tetany, myxedema,[4] disturbances of the sex-organs' function,[5] and in cases of myotonic disturbance[6] we are likely to find cataracts. These, however, differ from the juvenile cataracts which occur in association with the skin changes in Rothmund's disease.[7]

Of the skin changes, *scleroderma,* quite commonly found in Rothmund's disease, but not the cause of it, is itself of unknown origin. Some of the authors attribute it to

(a) Endocrine disturbances — Hoffman[8]
(b) Primary vascular disease—Kraus[9]
(c) Damage to vegetative nerve centers—Curshmann[10]
(d) Peculiar skin predisposition, aggravated by exogenous toxins (infection), trauma, exposure to cold and wet, and changes in the vascular system—Barkman[11]

It is characterized by a chronic localized or diffused induration and rigidity of the skin, which is tense, leatherlike, and cannot be pinched or lifted up, for it is bound down to the underlying structures. Associated with it is atrophy of subcutaneous fat and glands due to the pressure

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from increased fibrous and connective tissue. These changes mostly involve the breast, neck, forearms, and lower extremities. When the face is involved, facial hemiatrophy results (lack of expression).

Neurodermatitis, the next important symptom of the disease, is found in somewhat less than 50 percent of the cases. It is characterized by severe protracted itching, and a chronic eczema extremely obstinate to treatment, involving the face, the neck, and the flexor surfaces of the extremities. It is especially pronounced in the folds of the skin, resulting in a thickened, scaly, and eczematous condition. The face, because of lack of the usual folds and the grossly exaggerated thickened state, takes on a characteristic leonine appearance. The disease is not uncommonly associated with bronchial asthma and other allergic phenomena.

According to Ehrmann[12] the cause of neurodermatitis is primarily an endocrine disturbance involving the thyroid, ovarian, and pancreatic glands individually or severally. Last, but not least, it may be the result of digestive disturbances (chemical changes, interference with proper function of the Islands of Langerhans or mechanical motility of the bowel) and acid or subacid condition of the stomach.

Strandberg[13] agreed with Ehrmann that abnormal products of decomposition, not properly eliminated, become absorbed into the blood stream thereby resulting in irritation of the peripheral skin nerves, dermagraphia, urticaria with severe itching, and lead finally to an eczematous condition of the skin because of constant scratching.

On the other hand, numerous other authors, among them Urbach,[14] are more conservative and cautious in expressing their opinion as to the cause of neurodermatitis. They believe it to be a peculiar disturbance of the vegetative nervous system.

However that may be, it is by now clear that the causes of scleroderma and neurodermatitis are different. Although both may accompany the peculiar juvenile cataract in various individuals, it does not follow that either of the skin diseases is the cause of the cataract, but rather another symptom of the same disease.

The most characteristic symptom of Rothmund's disease is the lens changes. The lens opacity consists of numerous grayish-white dots of varying sizes which tend to become confluent in the central portion of the lens and scatter more diffusely toward the periphery. The posterior cortex is never so extensively involved as the anterior, and no cholesterin deposits are found as a rule, although Loewenstein[15] found multicolored cholesterin deposits in his case. Usually the nucleus of the lens is poorly visible, although it is unaffected. The main opacity is located axially in the anterior cortical layers, involving the superficial layers up to the capsule. Some authors claim that, on the whole, the morphologic picture of this cataract presents a remarkable resemblance to the cataracts caused by massive doses of X ray."[16]

In the following table an attempt is made to compile most of the specific cases described in literature thus far, clarifying them according to their outstanding symptoms.

From these tables it can be readily ascertained that scleroderma is the most common skin lesion, that prematurely gray hair is a quite common symptom, and that thyroid dysfunction is not at all rare.

Case report

C. B., a young man about 20 years of age, came with the complaint of a rapid

TABLE 1

MALES

No.	Age yrs.	Skin Pathology	Other Pathology	Cataract	Primary Onset
1	40	Scleroderma	Snow-white hair	At 28 yrs.	C. I Sc. II
2	36	Scleroderma at 33 yrs.	Prematurely senile. Gray hair	At 29 yrs.	Sc. II C. I
3	35	Scleroderma at 20 yrs.		At 34 yrs.	C. II Sc. I
4	36	Scleroderma at 26 yrs.		At 32 yrs.	Sc. I C. I
5	25	Scleroderma at 24 yrs.	Stopped growing at age 10	At 22 yrs.	C. I Sc. II
6	40	Scleroderma of several years		At ? yrs.	
7	44	Scleroderma at ? yrs.	Atrophy of genital organs	At 13 yrs.	C. I Sc. II
8	29	Scleroderma at ? yrs.	Sex organs poorly developed. Gray hair.	At 16 yrs.	C. Sc. II
9		Scleroderma at ? yrs.	Sex organs poorly developed. Late puberty	At 17 yrs.	
10	32	Scleroderma at ? yrs.	Infantilism. Lymphocytosis.	At 28 yrs.	C. I Sc. II
11	15	Eczema. Ichthyosis	Puberty at 15 yrs. Small stature	At 14 yrs.	C. I Sk. II
12	17	Eczema	Leonine facies	?	Sk. I C. II
13	25	Ichthyosis N. Dermatitis		?	C. II Sk. I
14	12	Eczema. Ichthyosis Dermographia	Asthma	Normal	Sk. I
15	42	Dermographia. Eczema	Leonine facies	Normal	Sk. I
16	28	Eczema. Prurigo "Besnier"	Asthma	?	C. I Sk. II

C. I = Cataract appeared first (eye symptoms are first in appearance)
Sc. II = Scleroderma appeared second
Sk. I = Skin changes appeared first

progressive loss of vision in both eyes for the past several months. Although his vision had never been good, for he was near-sighted, it did not interfere with his attendance at school. At the age of 15 years he started working for a living. Now his vision was so poor that he had to stop working.

His physical condition had always been good except for a dry scalp, scaly and at times itchy skin, often breaking out in "sores," for which he was treated unsuccessfully for years. Appetite and elimination were good, weight was stationary, the family history unknown.

Physical examination revealed a youth of 20 years, rather well developed, of normal height and weight. His appear-

TABLE 2

FEMALES

No.	Age yrs.	Skin Pathology	Other Pathology	Cataract	Primary Onset
1	38	Scleroderma at 22 yrs.	Snow-white hair	At 23 yrs.	Sk. I C. II
2	31	Scleroderma at 22 yrs.	Gray hair. Enlarged thyroid	At 25 yrs.	Sk. I C. II
3	37	Scleroderma	Snow-white hair	At 31 yrs.	Sk. I C. II
4	?	Scleroderma		?	?
5	?	Scleroderma		?	?
6	35	Scleroderma at 28 yrs.	Eunuchoid. Menstr. disturb.	At 32 yrs.	Sk. I C. II
7	32	Scleroderma	Thyroid enlarg. Tremor. Poor. hair.	At 32 yrs.	Sk. I C. II
8	37	Scleroderma	Gray hair. Basal m. +16	?	?
9	?	Scleroderma		?	?
10	30	Scleroderma	Goiter. Changes in sella turcica	?	?
11	9	Scaly dry skin Dermographia	Asthma. Enlarged thyroid.	?	?

ance was striking. The face, especially the forehead, the cheek, and the ears were coarse, dry, and scaly and lacked the usual folds, giving him a leonine expression. The skin of the rest of the body was likewise thickened, coarse and dry, with a lack of folds on the flexor surfaces. There was complete absence of hair on the abdomen; it was sparse in the axillae and arranged in a feminine way near the pubis. The sexual organs were small and undeveloped for the size of the body.

Laboratory tests gave the following results: Red blood corpuscles, 4.5 million; white blood corpuscles, 4,800; relative lymphocytosis, 16 percent eosinophilia. The blood chemistry was negative, as was also the urinalysis and the Wassermann reaction. The basal metabolism was −7.

Eye examination. The lids of both eyes were thickened, dry, and scaly. It was almost impossible to evert the lids manually. The conjunctiva of the lids was thickened, that of the eyeball was of normal appearance. The cornea was clear, the anterior chamber somewhat deeper than normal, the iris normal.

The lens showed subcapsular freely scattered opacities involving mainly the central portion of the anterior cortical layer, although the posterior layers were also involved, but not so much. The opacities were densest at the axis of the lens. Toward the periphery the opacities became rather thin and scattered. There was a free zone at the extreme periphery of the lens. The vitreous was not clearly visible and the fundus was likewise not seen. The cataract of the right eye was far more developed than that of the left.

Vision: O.D. without correction was 20/200; with a +0.75D. sph. = 20/200;

O.S. without correction 20/100; with a +0.50D. sph. = 20/70.

Operation. Cataract extraction was performed on both eyes at a six-month interval and consisted of a discission and five days later a keratome incision with irrigation of the soft lens matter.

Final result. Vision 20/20 in each eye with correction.

Conclusion

The important points to be remembered in Rothmund's disease are:

1. Occurrence of cataractous changes in rather young people with typical skin changes which may or may not arise simultaneously.

2. Evidence of pluriglandular endocrine disturbances.

3. Skin changes although bearing a similarity are not always of the same origin and are not therefore the cause of the disease.

4. The development of the cataract is rapid and progressive.

5. The prognosis as to the operation and subsequent vision is favorable.

6. Fortunately the disease is not common.

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CHOLESTERINOSIS LENTIS*

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Cholesterinosis lentis constitutes a particular form of cataract of which neither the etiology nor the pathogeny is clear. It is first necessary to differentiate between this type and other similar types of cataracts. The latter are: (a) Calcareous cataract, which is milky white in color and does not have the shining appearance of cholesterinosis lenti. (b) Xanthomatosis lenti,[1] which presents widespread fatty deposits without particular form and appears only in young people. Etiologically it is in very close relation to Niemann-Pick's disease. (c) Hypermature cataract, the result of the proteolysis of the necrotic lens mass, appearing white or yellowish in color, with cretaceous deposits scattered throughout. (d) Diabetic subcapsular cataract, which is characterized by pathognomonic subcapsular changes in the posterior cortex. It is always bilateral and most frequent in young people.

In cholesterinosis lentis brilliant crystals appear in the posterior cortex of the lens, irregularly deposited. It is usually unilateral and appears at any age. Knowledge of the pathology of this type provides us with very valuable information for clinical observations.

How does cholesterin appear in the lens?

Is it an element in composition that appears after a disturbance in the lens or is it an element that is transported from without with the nutritious matter?

It was in 1831 that Schmidt[2] first noticed the presence of the cholesterin crystals in the anterior chamber of a patient and wrote, "From the frontal surface of a white cataract, there seems to liberate itself, a shining powder, golden and very fine, which, trembling at first in the aqueous, falls like a thick carpet on the inferior surface of the anterior chamber." Since then it seems that all authors agree that the cholesterin originates in the crystalline lens. All relating publications (Poncet,[3] Königstein,[4] Desmarres,[5] Follin,[6] Scholer[7] arrive at the same conclusion: "Upon rupture of the lens capsule, cholesterin is deposited in the anterior chamber." As an explanation of this opinion, Jacobsen[8] in 1881 set forth that the cholesterin cannot possibly be a component which was transported through its nutrient matter to the crystalline lens, but was the product of a regressive metamorphosis of its albumin after a delayed absorption (Heilborn,[9] 1915). However, some of the experimental workers, such as Blassius,[10] Besserer,[11] and Heilborn,[9] have seriously questioned the existence of cholesterin in the lens. On the contrary there are important investigators such as Zehlender, Mathessen, and Jacobson,[12] representing earlier writers, and Kawarura[13] among the contemporary authors, who state with assurance that the normal crystalline lens contains cholesterin. Adams,[14] Neushiller,[15] Cahane,[16] and Salit[17] found in human cataractous lenses more than 0.25 percent cholesterol. Salit and O'Brien[18] accepted as positive the fact that there is a significant increase of cholesterol, both in aged and cataractous lenses. The strongest proof was advanced by Vogt,[19] who discovered that not only in complicated cataracts, but also in senile types, the formation of large cholesterin spots is not a rare occurrence. Lately, Sugita,[20] while examining a series of extracted cataracts, found fat deposited in

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the form of fine droplets in all parts of the lens. Joschichara[21] also noticed in a congenital cataract numerous cholesterin substances that appeared in the dark field when examined under the polarization microscope.

In spite of all these opinions, it may be said today that it has not been clearly proved that the chemical basis of this cholesterol is contained within the normal crystalline lens. It is known only that under certain conditions the lens is capable of presenting parts of local cholesteatoses. Chemicobiologically, only, is it certain that "The essential lipoids (phospholipoids, cholesterol) are necessary for the life of the cells and these substances presumably have some biological significance, of which we are, as yet, ignorant. It may be that the increase in fat is a secondary occurrence comparable to the common process of fatty deposition occurring in senile and degenerating tissues generally, depending essentially on a lessening of oxidative activity" (Duke-Elder[22]).

What is the pathogeny of these cholesteatoses?

An explanation may be derived from facts based upon known clinical and experimental evidence.

It is known that the crystalline lens possesses, among other elements, a quantity of lipoids. It is clear from the famous works of Goldsmith[23] that the lipoids increase, at an advanced age, following an alternating chemical play that occurs in the crystalline lens between the cystein and the cystin. Actually, if any cataract is very carefully examined biomicroscopically, small drops of lipoids or fine elements of cholesterin will be discovered in the crystalline masses in about 80 percent of the cases. Other changes of the colloids and lipoids within the crystalline lens that present cholesterin elements are found in coronary cataract, rosette cataract, mature cataract, in various types of senile and lamellar cataract, in nuclear cataract and various manifestations of cataract incipiens posterior. If we deny, then, even the actual existence of cholesterin in the crystalline lens, we can obtain it indirectly after a regressive metamorphosis or after a disturbance of these lipoids. But what is the pathogeny of this disturbance of the crystalline-lipoid complex, and what are the conditions that act to produce it?

The theories of the pathogeny of cholesterinosis bulbi and lipoidosis bulbi have already been proved by one of us (P. G.[24]). In lipoidosis bulbi there must always have preceded a prolonged irritation of the corpus ciliaris or of the iris. This irritation causes alterations in the adjacent tissues, in the form of an infiltrative lipoid degeneration. This localized disturbance of the lipoid complex produces the appearance of cholesterin crystals in the form of an exudate as a secondary sign. Before attempting an explanation of the pathogeny of cholesterinosis lentis, it must first be determined whether hypercholesterinemia could be a causative factor. There are many experimental investigations by Aschoff,[25] Verse,[26] Jesse,[27] Huth,[28] Rohrschneider,[29] and Joel[30] that have sought an explanation of this theory. All of these workers have concluded that, in animals, hypercholesterinemia can produce the appearance of cholesterin in the eye. However, after a long series of experiments one of us (P. G.[31]) has demonstrated that in man hypercholesterinemia does not produce the appearance of cholesterin in the human eye.

Turning now to an explanation of the pathogeny of cholesterinosis lentis—that is, an explanation of this shining image with the small and large crystals placed one upon the other without definite form —two points immediately attract the attention of the examiner: 1. The cholester-

in crystals are always placed in the posterior half of the crystalline lens. 2. There always exists, at the same time, an alteration of the lens capsule.

These two clinical facts in relation to the aforementioned theory give a very clear pathogenic explanation. The first cause of this always exists outside the crystalline lens. An infiltrative alteration of the ciliary body, the zonula, or of the vitreous body (possibly after long irritation) can cause a relative alteration in part of the posterior crystalline lens. This alteration of the capsule appears like a fatty infiltration of this membrane. Secondarily, it is dependent upon the intensity of the alteration before the crystalline masses suffer a disturbance in their lipoid complex. The result of this disturbance is the appearance of the cholesterine under the phase of local cholesteatoses.

In reality, if one observes a sufficient number of cases, it will be proved that behind or adjacent to the central part of the cholesteatosis, the crystalline capsule is always altered; either infiltrated or swollen. This alteration is not primary in nature but secondary. Definite proof of this is to be obtained by examining the eye, and particularly the corpus vitreum, the ora serrata, and the corpus ciliaris in so far as possible, and, in general, all parts that surround the crystalline lens, in order to prove that other alterations are primary signs. It is of great importance that the examiner persist in a detailed examination of the corpus ciliaris. The examination should always be made with the contact glass that will allow the perception of the finest alteration of these internal structures. Troncoso[32] and Trantas[33] have presented lengthy discussions on the advantage of contact glasses for a detailed examination.

Cholesterinosis lentis is always a cataract of secondary nature, for it is brought about by changes outside the crystalline lens. Retinosis pigmentosa, retinitis haemorrhagica, iridocyclitis, and uveitis are conditions most often causing cholesterinosis lentis. There is another condition that probably brings this about more often than the others, and that is highly toxic cyclitis latens. This inflammation of the corpus ciliaris is so slow that it is often developed, in many cases, without pain and lacking in clinical symptomatology.

It is possible that simultaneously with the advancement of the infiltration of the crystalline capsule, there is present an incipient cortical or lamellar or perinuclear cataract (in elderly patients). This disturbance of the crystalline-lens composition favors, without doubt, the interference of the lipoid complex and causes the appearance of cholesterin crystals, more quickly and in greater quantities. In two previous works one of us (P. G.[24]) has explained the pathogeny of the appearance of cholesterin in the anterior cortex of the eye as well as in the posterior cortex. The conclusions reached can explain the cholesterinosis of the lens because of the fact that cholesterin crystals appear in the iris, the anterior chamber of the cornea, the hyaloid, or the retina after a sustained irritation of the corpus ciliaris or its adnexa.

Summary

1. Pathogenic explanation of cholesterinosis lentis is based upon the pathogenic theory of lipoidosis bulbi. Conditions found outside the crystalline lens produce an infiltration of the posterior cortex of the crystalline-lens capsule. This infiltration follows a secondary disturbance of the lipoid complex of the crystalline masses, producing the appearance of shining crystals of cholesterin.

2. Cholesterinosis lentis is always a secondary cataract, and we should persist in detailed examinations to discover the primary causative factor.

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NOTES, CASES, INSTRUMENTS

ERYTHEMA NODOSUM EPISCLERITIS

A CASE REPORT

EUGENE W. ANTHONY, CAPT. (MC), A.U.S.
AND
DON MARSHALL, MAJOR (MC), A.U.S.

A brief discussion and bibliography on this subject may be found in Duke-Elder's, "Textbook of ophthalmology."[1] One case in the English literature was reported by Green and Perry in 1939.[2]

One month prior to his admission to the hospital on March 15, 1943, the patient was off duty for four days because of fever and sore throat. On March 8th, he developed pain in both hips and the lower back, which made walking difficult. On March 14th, tender red spots appeared over the anterior and medial aspects of both legs. There was no previous history of arthritis, rheumatic fever, or skin eruptions.

The physical examination on admission revealed redness and exudate on the left tonsil, tenderness over both knee joints, and several moderately large, red, swollen nodules over the anterior aspects of both lower legs, typical of erythema nodosum. Temperature varied daily between 100° and 103°F.

The laboratory findings of March 16th were: Blood count, R.B.C. 4,940,000 with hemoglobin 85 percent; W.B.C. 13,750; 73 percent polymorphonuclears, 23 percent lymphocytes and 4 percent monocytes; electrocardiogram, normal; X-ray film of chest, normal; Kahn test, negative; blood sulfa-drug level, zero; blood cultures, no growth; Widal and undulant fever reactions, normal.

Salicylates were given for the first 5 days, with an average daily dose of 80 grains. Little improvement resulted in either symptoms or temperature, and the drug was discontinued on the sixth day. In the next 24 hours the patient received 120 grains of sulfathiazole and 40 grains of sodium bicarbonate. After the first few doses of this drug the patient became nauseated and vomited forcefully. The joint symptoms became worse, and a small macular rash appeared on both hands. The eyes were somewhat irritated and it was noticed that they were slightly red.

Ocular examination: Examination on March 23d revealed involvement of the external and internal bulbar conjunctiva of both eyes. There was no redness of either palpebral conjunctiva. The lesions consisted of several small, raised, yellowish nodules surrounded by deep redness fading into a pink and then finally surrounded by a slight bluish flush. The largest nodule was in the right outer angle and measured about 1½ mm. in diameter. There was a small subconjunctival hemorrhage in this region extending 3 mm. from the limbus. Pressure on the lid over these areas revealed slight tenderness but no pain. The nodules were movable on the sclera. The drawing shows the relative size and location as compared with the cornea (fig. 1). Above and below the cornea the bulbar conjunctiva was completely normal. Cornea, iris, lens, media, and fundus were normal upon bedside examination with loupe and ophthalmoscope.

The sulfathiazole was discontinued on March 23d, and the salicylates resumed as before. The macular eruption on the hands disappeared the next day. Three days later, on the 26th, the hyperemia of the inner angles was much diminished, but the nodules could still be made out. There

was still moderate hyperemia of both outer angles. Most distinctive was the yellowish discoloration present in the subconjunctival tissue, extending laterally and medially from the limbus about 9 mm. and fading into a faint bluish haze. The nodules were smaller but easily visible on top of the yellowish discoloration. The patient was comfortable except for some slight joint pains and the red sore eruptions of the legs, which were subsiding.

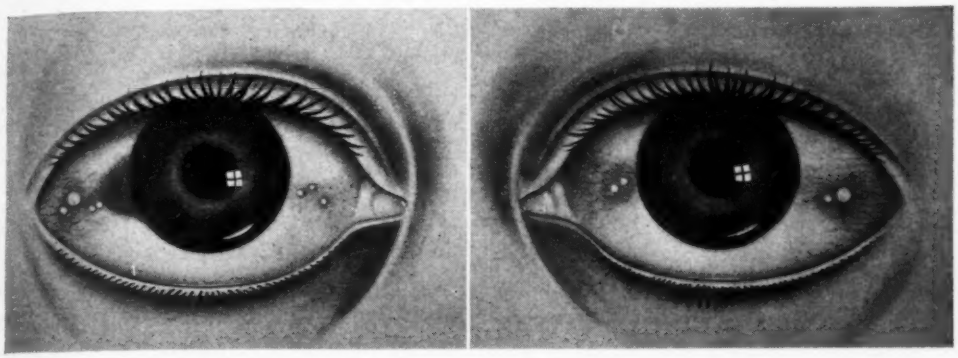

Fig. 1 (Anthony and Marshall). Erythema nodosum episcleritis.

On March 28th, the outer angle of the left eye was nearly clear with the exception of a moderate yellowish color. Nodules could still be made out in the other areas, the right outer angle showing the least improvement. The small subconjunctival hemorrhage of this area was partially absorbed.

The yellowish discoloration was the last sign to disappear, and the eyes were again normal on about April 7th, two weeks after the first observation. It was also at about this time that all signs of the nodules on the legs disappeared.

To determine if the eye lesions might reappear, all medication was stopped on the 29th of March for a period of 32 hours. The patient became very uncomfortable, with marked increase in joint symptoms and a rise in temperature from 100° to 103°F. There was no recurrence nor exacerbation of either the eye signs or the erythema nodosum. The sulfathiazole was not resumed at this time because of his physical discomfort. Salicylates were resumed and again he clinically improved. On April 14th he was placed on 90 grains of sulfadiazine daily, so that on the 21st and 23d he had a blood level of over 8 mg. percent. No untoward symptoms resulted and no special improvement occurred.

His general condition improved very gradually and occasional evening temperature rises were present until the middle of June. In view of the convalescence required, following three months in bed, he was transferred to an Army Hospital in the Zone of the Interior.

Discussion

One might suggest that the ocular lesion was caused by a sensitivity to sulfonamides. However, the eye changes persited for two weeks after withdrawal of the drug and were not reproduced by later use of another sulfonamide. It would seem that the lesion was aggravated by the withdrawal of the salicylates not unlike the exacerbation that occurred in the joints. The ocular signs reported by Green and Perry, in 1939, are almost an exact

duplicate of those seen in this case, and occurred in a patient having erythema nodosum. No sulfa drugs were used in their case.

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PRIMARY MENINGOCOCCIC CONJUNCTIVITIS TREATED BY SULFADIAZINE

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Endogenous meningococcic conjunctivitis occurs as a rare complication of epidemic meningitis. Still more rare is exogenous meningococcic conjunctivitis uncomplicated by general symptoms. While numerous reports in the literature attest the favorable effect of the sulfonamides on meningococcic meningitis, no reference as to their effect on exogenous meningococcic conjunctivitis has appeared as yet. For this reason the following case report would seem to be of interest.

Report of case. W. T. S., a young white man, aged 21 years, was admitted to the Station Hospital, Drew Field, Florida, on March 27, 1943, with German measles of one day's duration. There was a typical punctate rash with posterior auricular-node enlargement. The rash disappeared on the fifth day after admission, and the patient appeared to be well on April 1st. At no time were there any ocular signs or symptoms.

On the evening of April 2d the onset of a bilateral conjunctivitis was noted by the nurse in charge, and when seen by the writer on the morning of April 3d the patient exhibited a severe bilateral acute purulent conjunctivitis. The conjunctiva showed marked papillary hypertrophy, and there was a profuse purulent discharge. Both corneas were clear. Gram-stained smears of the exudate showed predominant polymorphonuclear leucocytes and many typical Gram-negative intracellular diplococci of gonococcus-like morphology. A tentative diagnosis of gonorrheal ophthalmia was made, and the patient was examined for evidence of urethral gonorrhea. No previous history nor evidence of the disease was found, however, and the patient denied having had any recent sexual contact. Treatment consisting of full doses of sulfadiazine by mouth, combined with boric-acid-solution irrigations every two hours and followed by instillations of 5-percent sulfathiazole ointment, was instituted.

On April 5th both eyes showed distinct improvement, and the discharge had become scanty. By April 12th, the conjunctival secretion had stopped but there was still some slight residual inflammation. On April 16th, the cultures taken on the second day of the disease were reported to be meningococcus, and this diagnosis was later verified by the laboratory of the Fourth Service Command. On April 20th, after three successive negative smears and cultures had been obtained, the sulfadiazine and local eye treatment were discontinued, and the patient was discharged on April 25th. Vision was 20/20 in each eye, and the conjunctiva had returned to normal.

The sulfadiazine treatment consisted of an initial dose of 2.0 gm. followed by 1.0

gm. of the drug every four hours day and night, combined with an equal amount of sodium bicarbonate, for the first four days. After this the sulfadiazine and bicarbonate were reduced to 1.0 gm. four times daily for the remainder of the treatment period. Blood levels varied from 3 mg. percent to 20 mg. percent, but averaged 6 mg. percent. The blood picture remained normal during the treatment period. A throat culture taken on April 14th was negative for the meningococcus. There was no febrile reaction at any time during the course of the disease.

Comment

The conjunctivitis responded rapidly and satisfactorily to sulfonamide therapy, and no extensions to the blood stream or to the meninges occurred. The rapidity of the response was comparable to that seen by the writer in sulfonamide-treated cases of gonorrheal ophthalmia.

The source of the infection was undetermined, but it may have been a ward contamination, since two cases of meningococcic meningitis were under treatment at the time that the patient was confined with German measles. These cases were isolated in separate rooms, however, while the patient under discussion was kept on the ward. During the previous two months sporadic cases of meningococcic meningitis had been appearing on the Field.

The reported case well illustrates the necessity of examination by culture of Gram-negative diplococci in purulent conjunctivitis to make a differential diagnosis between gonorrheal ophthalmia and primary meningococcic conjunctivitis, which may be clinically indistinguishable. Needless to say the medicolegal and social consequences of confusing them are potentially very great.

Station Hospital.

UNUSUAL EYE FINDINGS IN IDENTICAL TWINS*

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Similar eye findings are of interest in individuals, still more in identical twins. Attention has been drawn to this by the not-infrequent reports in the literature. This additional report is published to note the similar eye findings in identical boy twins due to congenital factors.

One was seen at the age of five months because of cleft palate, and the other at the age of four years. They had similar eye findings of high compound myopic astigmatism in their right eyes and congenital complicated cataracts in their left eyes. One subsequently had a detached retina in the right eye.

Their deliveries were normal, and there were no congenital defects except those described.

There were two other children in this family, both older. A sister, aged seven years, was seen in December, 1942. She presented a high myopic astigmatism, the vision without correction being 1/60 in each eye. When corrected, the vision was 6/20 + 1 in each eye with a −10.00D. sph. ⌯ −0.75D. cyl. ax. 180° for the right eye and a −10.00D. sph. ⌯ −1.25D. cyl. ax. 180° for the left eye. She was mentally alert and exhibited no other physical defects, although both fundi showed pallor of the discs with retraction of the scleral rings, which is often seen in high myopia.

A brother, aged nine years, was seen at the same time as the sister. He had progressed normally in school and was in good physical condition. His vision was 6/18−1 in the right eye and 6/15 in the left eye, without correction. He had a

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compound hyperopic astigmatism and was wearing a +0.50D. sph. ⊂⊃ +0.50D. cyl. ax. 90° for the right eye and a +0.75D. sph. ⊂⊃ +0.50D. cyl. ax. 90° for the left eye; this correction brought his vision to 6/6.5−2 in the right eye and 6/6 in the left. The fundi were normal.

The father was interviewed, but not examined. He stated that he had never had any difficulty of vision, nor had any of his family.

The mother has poor vision. Her home life is incompatible and she is now in the State Hospital for the Insane. As far as can be determined her family history is negative. A report on her condition from the State Hospital ophthalmologist is as follows:

"Vision is very poor. The right eye reveals a high myopia, fluid vitreous with opacities, cataractous lens, partial detachment of the retina, and degenerative choroiditis resembling luetic type. The left eye reveals a similar condition except that the lens is dislocated temporarily. Iridodonesis is present, and the retina is is not detached."

The blood-Wassermann test was positive and the spinal fluid negative in 1942. Her diagnosis is schizophrenia, paranoid type, and latent syphilis.

As stated before, one twin, Elmer M., was seen in the Clinic for congenital cleft palate involving the posterior two thirds of the hard palate, the entire soft palate, and the uvula. This was repaired by means of a two-stage operation at the ages of three and four years, with complete cure. This boy had a speech defect from this condition with some mental retardation as noted by a psychologist. Both conditions improved after surgery was performed. The general physical findings, including urinalysis, blood examination, Kahn and Wassermann tests, were negative with the exception of hypertrophy of the tonsils and adenoids with chronic infection. This patient subsequently had his tonsils and adenoids removed and preputial adhesions loosened

A peculiar eye condition was observed prior to the first operation on the palate, and the child was seen in consultation by the Eye Department three years later, on January 13, 1941. The eye findings were as follows: Vision was not obtained. The eyelids were normal externally and opened and closed freely. The ocular movements were unimpaired. The conjunctiva and cornea were clear. Tension was normal to palpation. The fields were not obtained. The pupils and reflexes were normal. In the right eye the fundus showed a high myopia with pallor of the disc and retraction of the scleral ring. In the left eye the pupil was small, reacted poorly, and was occluded; the fundus could not be seen. The lens was cataractous, congenital in type.

The left eye was operated upon, a crucial discission being performed. The membrane was leathery, calcified, and nearly impossible to cut. Seven months later, iridectomy and linear extraction of the lens were performed. The mass was adherent to the iris, and after extraction a grayish membrane (the posterior capsule) persisted. This was incised and a serosanguineous fluid obtained. There was no loss of vitreous. Seven-and-one-half months later a V-shaped discission was performed. The membrane was thick, difficult to cut, and did not retract. No improvement in the vision was noted, and the fundus never could be seen. Further operative procedure was abandoned.

The right eye was refracted, and when last seen on August 20, 1943, the patient's correction was a −13.50D. sph. ⊂⊃ −1.25D. cyl. ax. 180°, and the vision was 2/60.

The second twin, Albert M., four years

old, was seen on March 19, 1942, because of poor vision. His general physical examination, blood studies, urinalysis, Kahn and Wassermann tests were negative. There was no deformity of the palate, but hypertrophied tonsils with obstructing adenoids were present together with a phimosis. He had surgery for these conditions with a good result.

His vision was poor. The eyes were normal in size, shape, and position. The lids opened and closed freely, the ocular movements were unimpaired, and the conjunctivas and corneas were clear. In the right eye the pupil was round, it dilated well under cycloplegia, and responded to light, in accommodation, and convergence. The media were clear. The fundus was myopic and showed pallor of the disc. The patient was given a prescription of −18.50D. sph. ⌯ −2.50D. cyl. ax. 180° for the refractive error in his right eye.

Externally the left eye was negative. The pupil was fixed and occluded, but reacted slightly to light. The lens was cataractous, and the fundus was not seen.

Discission was attemped. The lens could be moved, but could not be cut through. The findings were similar to those in his twin brother's eye, and further surgery was not done. This boy got along well until November 2, 1942, when his father stated that he suddenly lost his sight in the right eye. When seen, the pupil was dilated, but reacted. He had light perception, but no light projection. There was a nearly complete detachment of the retina from the 1- to the 6-o'clock position temporally, involving the macula and most of the disc. The vitreous was hazy. The prognosis was poor.

Reattachment was attempted on November 6, 1942. One month after dismissal from the hospital the patient could see moving objects. There was some reattachment, but the vitreous was so cloudy that the fundus could not be seen well enough to undertake further operative procedure.

Albert M., last seen here on August 20, 1943, had slight light perception, but no light projection. The lens was hazy and there were posterior corneal opacities. The vitreous was cloudy and the fundus was not seen.

The boys are now mentally alert and in good physical condition. They have been sent to the State School for the Blind for instruction.

In view of the findings in the mother's case, the conditions were undoubtedly congenital and probably inherited. There is no hope of vision in the eyes with the congenital cataracts, which probably have a congenital degeneration as well. The prognosis for the myopic eyes is poor, as this condition is, no doubt, due, in part, to a defect in the germ plasm. It may result in a detachment of the retina in the twin Elmer M. as it did in his brother's case, although his myopia is not so great.

Quain and Ramstad Clinic.

A MODIFIED FILM ADAPTER FOR RETINAL PHOTOGRAPHY*

FERDINAND L. P. KOCH, M.D., AND ARTHUR F. WILLIAMS
Saint Paul

Those who prefer the bantam film pack for photography of the human eyegrounds, whether for color or for black-and-white delineation, have been compelled of necessity either to design their own film carriers or to rely on the Rollex adapter[1, 2] (figs. 1, 2, 3). The expense of the former commonly does not justify

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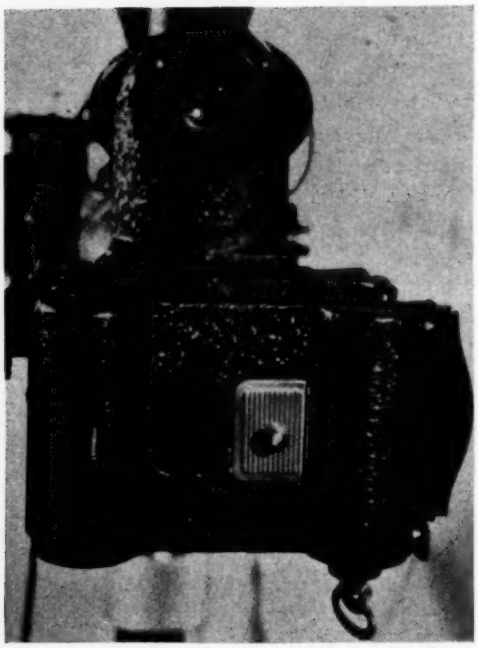


Fig. 1 (Koch and Williams). Rollex adapter in place at end of tube in plane of photographic layer with focusing eyepiece of Zeiss-Nordenson retinal camera above.

the results obtained, while the latter possesses inherent vagaries that are directly attributable to the lack of sturdy precision construction. The hinged outer shell, or housing, usually gives satisfactory service, but the inner film holder proper, which is removable from the housing, has several faults each of which may be responsible for, or is causal to, the tearing of the film strip and the subsequent loss of the exposures made.

The unmodified body, or holder, or the adapter is simple in design and construction: Each of two light metal rollers situated close to the base at each end is maintained in position by means of permanent insertion of the roller ends into a depressed axle hole on each side of each end of the base of the holder; however, these rollers unfortunately are not cushioned either by bushings or bearings. This lack results in a gradual and irregular enlargement of all four axle holes as the adapter continues in use. This, in turn, causes irregular alignment and subsequent eventual tearing of the film strip.

The holder, as well as its two parallel vertical sides, is stamped from thin light metal approximately 0.5 mm. in thickness. The sides arise from the flat base at an angle of 90 degrees and the film itself is so maintained in the holder that the metal roll, or spool, on which the film is packed is positioned just above but slightly inward from each of the two rollers over which the film travels. The film is brought around underneath the holder so that the free end can be carried

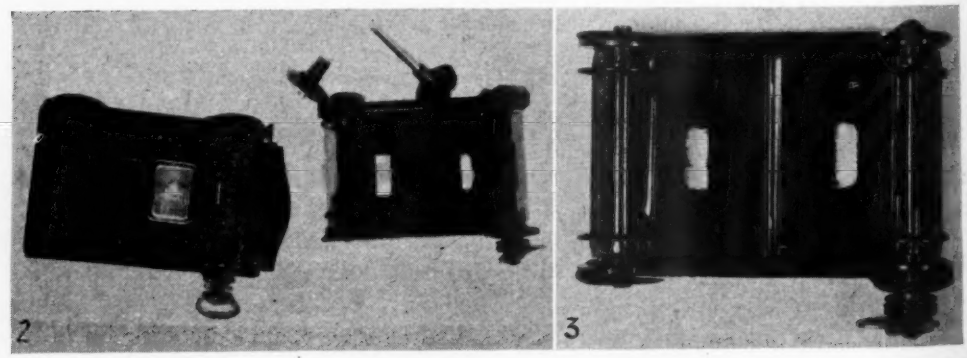
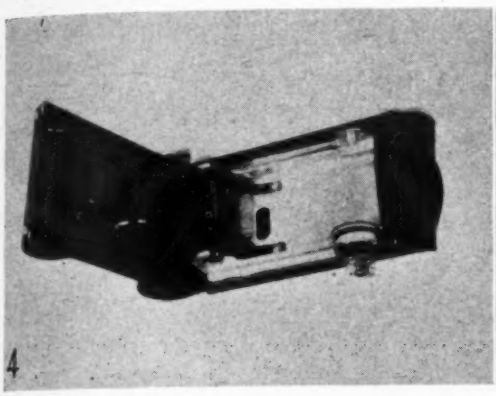


Fig. 2 (Koch and Williams). Rollex adapter housing to left and film holder proper to right. Fig. 3. Detail of film holder of Rollex adapter showing empty bantam spools with reducing studs at each end of each spool. Hand-turning key is seen at lower right-hand corner of holder.

up and forward and locked into the forward spool the rotating movement of which is initiated and controlled by a small, hand-turning key. The latter can rotate only in a counter-clockwise direction. The key rarely is able to withstand the relatively extreme force necessary to effect progressive movement of the film when the latter is subjected to shear off, and this constitutes another annoying structural weakness that must be considered together with those already mentioned in designing a new film holder or in modifying the fairly commonly used Rollex adapter.

One of us (F. K.) in conjunction with Mr. Kern Larkin of The Institute of Ophthalmology, New York City, found



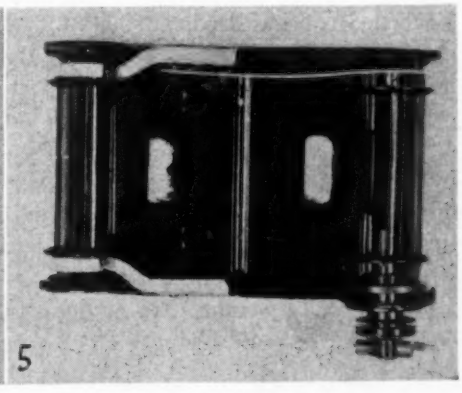


Fig. 4 (Koch and Williams). Film holder of sturdy brass construction, in place in housing. Bright surfaces proved to be unsatisfactory. Designed in conjunction with Mr. Kern Larkin.
Fig. 5. Modification of film holder, or carrier, showing detail of thin spring strip above for support of forward spool to the right and the supporting hooked loops for the rearward spool to the left. These new parts ordinarily are blackened with dull lacquer but they are shown here in white for clarification.

stresses occasioned by irregularities of the holes in which the rollers turn on their axes. The film spools are seated in small stamped-out grooves that do not permit of their easy rotation. The forward spool locks into position by means of resistance furnished by a very weak spring seat at the end of the spool opposite the turning key.

The holder accommodates 127 film without the use of studs, as Bogart[3] recently has pointed out; however, when 35-mm. film is to be used it is always necessary to insert studs, or reducing ends, at both ends of each spool. These studs carry small, protruding restraining pins which are received into the ends of lengthwise open slots in the spools, but these pins not infrequently break or it expedient, several years ago, to construct a film holder that appreciably increased spring-seat resistance and prevented slipping of the forward, or activating, spool while undergoing rotation (fig. 4). This greatly reduced the loss of film from mechanical disabilities but, since greater strength had been obtained by the use of a heavy, rigid brass base, another difficulty arose: It was not feasible to effect a properly dull patina or to oxidize inexpensively the gleaming brass surface. Painted finishes tended to flake and chip. It became necessary to develop an entirely new table of amperage and exposure values because the antihalation properties of the color film were not always sufficiently adequate to obviate retroillumination from the underlying

brightly reflective surface of the new holder.

It seemed desirable, then, to incorporate these same features of sturdiness into the base supplied as an integral part of the Rollex adapter. This we believe we have accomplished without the use of additional important metallic materials and without increasing appreciably the weight of the device; nor have we sacrificed the blackened, or oxidized, surfaces of the original holder proper. The changes may be effected in any even only modestly equipped instrument shop.

Our modifications have been effected by drill-punching into previously determined positions six to eight small, additional pieces of metal five to seven of which, respectively, may be fabricated from any light-weight alloy at hand but one of which should be tempered ferrous metal since it is utilized as a spring strip. The latter is patterned to comma-shape to form a rearward rectangular base and a flat, ovoid, spatulate forward end. Onto the inner surface of this ovoid end there is rivet-mounted centrally a small, rounded nubbin, 5 to 6 mm. in height. This snugly receives the open end of the film spool opposite the turning key and takes the place of one of the reducing studs previously mentioned. The ovoid, forward end of the spring strip narrows downward and backward at a 20-degree angle into a continuation of the strip the bottom edge of which closely juxtaposes the inner surface of the base of the holder proper. The outer surface of the rearward end of the strip is applied to a small, flat, rectangular metallic block which, after riveting, holds the strip 3 mm. inward from the lower inner surface of the side of the holder. This position is permanently secured by through-and-through punch-riveting the strip, block, and side of the holder. The forward end of this spring then is free and elevated and parallel to the side of the holder, so that the forward spool rotates easily against the firm resistance offered by the unanchored spatulate end of the spring strip (fig. 5). It is necessary, however, to interpose one reducing stud between the socket of the turning key and the end of the film spool itself.

The rear spool is held securely in place by punch-riveting a curved, hooked piece of metal onto the upper inner surface of the rearward one third of each vertical side of the holder. These two small pieces are so fashioned as to provide a forward, flat rectangle from the rear end of each of which there stems a rigid strip that curves progressively backward, inward, downward, upward, and then forward to form a loop to receive the ends of the film spool when the latter is brought downward and backward from slightly forward and above to be inserted into position as described (fig. 5). This modification for receiving the rearward spool obviates the use of the two reducing studs previously employed. This decrease in the number of moving parts further adds to ease of operation.

It is desirable in some of the Rollex models, in addition to the above modifications, to rivet a thin metallic strip along each side of the bottom surface of the holder itself. These strips, of necessity, will vary slightly in length, breadth, and width, but their proper placement has the advantage of providing an exactly measured surface track for the guidance of the confined film strip as it progresses from the rear, or second and packed spool, to the forward receiving spool along the bottom aspect of the holder proper; furthermore, it also aids in preventing the metal rollers from becoming so axle-worn that they would rotate irregularly.

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REFRACTION CLINIC*

Discussion by Albert E. Sloane, M.D.†

Boston, Massachusetts

Case 1

A three-year-old girl, in whose left eye there had been about 10° of esotropia for distance and near, during the past eight months, was presented for examination.

Examination

Under atropine, she would accept O.D. +2.50D. sph.; O.S. −3.50D. sph. ⊂⊃ −2.50D. cyl. ax. 180°.

What should be done in this case?

Discussion

Can the squint be explained on the basis of excessive accommodation? We know that accommodation cannot occur in one eye without being expended in equal amount in the other. If a child fixates with the hyperopic eye, accommodation will be required, and it is not unlikely that this accommodation will cause an over-convergence effect or esotropia.

The fact that the hypermetropia is not high (+2.50D. sph.) and yet is capable of producing a squint, is explained by the fact that the vision in the left eye is relatively poor. Therefore, little fusion amplitude can be present to offset or neutralize the over-convergence response. Thus, for all intents and purposes, the squint must be evaluated essentially in terms of the right eye.

Treatment

For immediate treatment it is well to consider this case as one of potential accommodative esotropia. In that case, we should fully correct the hyperopic error in the right eye to suppress all excessive accommodative effort. The left eye should be corrected for another reason: to improve the visual acuity as far as possible by sharpening the focus on the retina. However, we must be careful not to correct the myopia so fully that accommodation will become necessary, since at this stage we are attempting to suppress accommodative activity.

For this reason I would suggest correcting the astigmatic error, but well undercorrecting the spherical error O.S. and fully correcting O.D. Prescription: O.D. +2.50D. sph.; O.S. −1.50D. sph. ⊂⊃ −2.50D. cyl. ax. 180°. Assuming that this would make the eyes straight, one could then attempt to improve vision in the left eye further by prescribing amblyopic exercises for the near vision: coloring pictures, and the like.

I do not believe we can hope for full binocular fixation with all refinements in view of the high difference in refraction (antimetropia.)

In the event the squint was not corrected by this method, one would probably resort to surgery. This should be postponed until it has been proved that:

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†Director of Department of Refraction.

1. Glasses do not help. 2. A resultant exotropia is not too likely to occur (because there will be more divergent effect as the head grows in size).

Questions

House Officer: Is it not true that many children of this age have latent hypermetropia (+2.50D.) without a squint?

Dr. Sloane: It is true that this amount of latent hypermetropia is a common finding, but in this child the binocular status of vision has already been handicapped by the high anisometropia, so that there is not an adequate desire to use both eyes together to hinder or restrict an excessive reaction on the part of convergence to accommodation.

H. O.: Would you not expect the myopic left eye to be an exotropic eye rather than in an esotropic position?

Dr. S: In this situation, there are two reasons that prompt an esotropic position for the left eye rather than a divergent one:

1. It is not the error of the eye itself that determines the position, but rather the demand on accommodation and the indirect demand on convergence. In this case, although the left eye is myopic, the demands on accommodation are made by the right eye, which is hyperopic, and the same amount of accommodation that goes to the right eye is also going to the left eye.
2. The orbit in a child under five tends to direct an eye that is not in use to a convergent deviation. Later the orbits tend to produce a divergent position in an unused eye. It is this transition from the convergent to a divergent direction that is frequently responsible for neutralizing a convergent squint, and it is to this sort of situation that one refers when he says, "My son grew out of his cross-eyes."

H. O.: Would it not be feasible to occlude the right eye and build up vision in the left eye with a proper glass and then fully correct both eyes to emmetropia and train fusion at that time?

Dr. S: Theoretically one could equalize the retinal images with a correction, but we could not know until the child is older how much his visual acuity improved, and, in the meantime, we may be exposing him to a handicap through not using his better eye. For practical purposes it would be best to allow him to see well with his right eye, correct his strabismus if possible with glasses, and improve the amblyopic left eye by amblyopic exercises for near.

Case 2

A woman, aged 42 years, reported for examination, complaining of difficulty in seeing at near. She was wearing: O.D. +4.00D. sph.; O.S. +4.00D. sph. Uncorrected vision in each eye was 20/200. With a +4.50D. sph. for each eye, vision was 20/20. Add. +0.75D. sph. Wells I. With these lenses vertical and horizontal orthophoria was present.

Discussion

Obviously the symptoms are referable to the combination of her requiring a greater plus value for distance and the onset of her presbyopia. The question that we are to decide is whether or not bifocals are indicated. People who have never worn bifocals before usually find it difficult to make the adjustment. Moreover, bifocals have certain objectionable features; such as, implying old age. (This is an important objection for many people.) Furthermore, at best, bifocals represent a compromise so that certain areas of the field have their clarity sacrificed in

the interest of the reading portion. On the other hand, there are definite advantages to bifocals, since they make immediately available a near and far correction without necessitating a change of glasses. Another factor favoring the prescription of bifocals here is that it is easier to get used to a weak segment (+0.75D.) than a stronger one.

I have found that bifocals are best tolerated when that situation is present where one cannot read at all with the distance glasses and yet can read through the reading segment. In other words, the patient has no choice as to which portion of the glass he must use in order to read. In cases where only a weak addition (like +0.75D.) is required for the near correction, the patient is usually able to read everything except fine print with the distance lenses. It is true that this abilty to read with the distance lens cannot be maintained, nor is it always comfortable, but for purposes of transient vision it suffices. Thus this patient with her glasses made up as bifocals would be able to read through her distance glass, but be able to read still better through the bifocal segment. The difference between the distance and near segments therefore is not one of being *able* or *not being able* to see, but simply of seeing more clearly through the "add." Since for most purposes fine near vision is not requisite, the patient will not know whether to look through the segment, which is unnatural, or through the center of the glass, which is more natural. It is preferable to correct the vision for such eyes in the following ways:

Solution 1. Prescribe the full distance correction in single-vision lenses. These would serve for all ordinary work since distance vision will be good, and a person aged 40 years has about 3.50D. of accommodation to help for most near work. In addition, give her the correction for near vision, also in a single-vision lens, for prolonged near work. I like to refer to this latter as a "library spectacle."

Solution 2. Order a distance glass in single-vision lenses and order *for near work* a bifocal. Wear the bifocal only for reading; this allows the person to get used to the bifocals gradually, subjecting him to none of their disadvantages. They later may be used entirely if the patient wishes.

3. Order bifocals where the occupation of the person is such that the most precise near vision should be available as well as the most precise far vision at the same time.

Questions

House Officer: What is the weakest bifocal strength (presbyopic add) that you would order?

Dr. Sloane: I usually start with +1.50D. sph. add. I occasionally prescribe +1.25 add and only in unusual situations do I order less as a bifocal add.

H. O.: How does method 2 help solve the problem?

Dr. S.: In the first place, the patient is going to wear the bifocals only for reading. Here you require precise vision, and the person will easily be able to tell through which section of the glass she reads more comfortably. She will also have the opportunity gradually to accustom herself to other problems encountered in the use of bifocals. People of this age find it difficult to appreciate that their near vision should be different from what it was just a few year ago, and it is much easier to allow their reading glasses to bring home to them this fact than to talk them into wearing bifocals for constant use.

243 Charles Street.

SOCIETY PROCEEDINGS

EDITED BY DR. DONALD J. LYLE

ROYAL SOCIETY OF MEDICINE

SECTION OF OPHTHALMOLOGY

October 9, 1942

MR. FRANK A. JULER, *chairman*

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RECURRING JUVENILE VITREOUS HEMORRHAGE

MR. FRANK A. JULER said that the condition known in this country as Eales's disease was first described in 1880.

A summary of the literature and a description of the disease were given in 1932 by H. P. Hutchinson. Since that date there have been few references to it here, but on the Continent and in America it has received some attention.

Hutchinson (1932) concluded (1) that no constitutional disease is usually present, but often some measure of lowered vitality seems to exist, (2) that there is no satisfactory evidence that tuberculosis is a cause, (3) that the disease is probably due to a deficiency in some blood constituent or to the presence of some toxic product causing damage to the capillary endothelium with resulting diapedesis. He mentioned, too, a possible vitamin deficiency allied to scurvy, although no symptoms of scurvy except epistaxis have been noticed.

Lawson (1935), in a discussion on diseases of the blood, stated that Eales's disease was characterized by a marked increase in the coagulation time of the blood. Mr. Juler said that he had not been able to find any confirmation of this nor had his own observations shown that this was true. As Hutchinson says, "Deficiency in calcium, prolonged bleeding time, and delayed coagulation seem to be ruled out in almost every case in which these points have been investigated."

R. T. Paton (1938) described five cases, and concluded that the condition was always traumatic, toxic, or infective.

Jeandelize and Drouet (1936) attributed the disease to an endocrine defect. They asserted that there was a condition of hyperpituitarism which might be either primary or secondary to hyper- or hypothyroidism or to a dysfunction of the adrenals or gonads. Its presence was shown by the detection in the urine of a melanosome-dispersing factor. The only other evidence which they gave was (1) a narrowing of the visual fields, chiefly bitemporal, amounting to 10 or 20 degrees, and (2) hypertension of the retinal arteries.

Recent work by Noble and others (1938) on the posterior lobe of the pituitary has shown that injection of its extract produced pressor effects and hyperglycemia, sometimes with achlorhydria and hyperchromic anemia, while the urine of the experimental animals contained substances producing pressor and antidiuretic effects; from a test on the frog a melanosome-dispersing action is obtained. Idris Jones (1938) described a case in which these findings were detected clinically and diagnosed as due to an overactivity of the posterior lobe of the pituitary gland. His patient was a man, 26 years old, and the disability lasted only a few months. There was no vitreous hemorrhage.

Dax (1938) reported the presence of a melanosome-dispersing substance in the blood and urine of eight adult mentally

defective patients with retinitis pigmentosa. Idris Jones said that he would hesitate to say that this substance is pathognomonic of hyperpituitarism, but should there be other evidence of excessive pituitary action, then it could be used as a confirmation.

McArevey and Somerville-Large (1939) reported two cases of Eales's disease in which there was a low excretion of vitamin C in the urine; neither patient had suffered a relapse since that diet was augmented. The period of freedom from recurrence was, however, not stated. Several observers, including Hutchinson (1932) have suggested that some deficiency condition may be present in this disease, and the above observations invite confirmation.

Harris (1940, 1942) recently found that school children showed a low level of vitamin C at the end of the winter, and that the present average was lower than in a pre-war period.

The symptomatology of severe vitamin-C defect was described by Crandon (1940):

These researches indicated that ascorbic acid is stored in the body, and that a high blood and urine content was found only after saturation had been reached. The determination of the body content, therefore, requires more than a simple estimation of the amount of vitamin C in the urine or plasma.

In the cases reported by Mr. Juler no investigations were made on this possibility, though from clinical experience during two years of war it did not appear that Eales's disease was on the increase, as one would expect if an ascorbic-acid deficiency of a mild type were in some way a factor.

In "Modern trends in ophthalmology" (Ridley and Sorsby, 1940) Redslob emphasizes the presence of an actual periphlebitis of a tuberculous nature, an explanation which was strongly supported by Axenfeld, Stock, and others. He refers also to Marchesani's theory that Eales's disease is a manifestation of Buerger's disease (thrombo-angiitis obliterans). Marchesani's patients had circulatory disturbances varying from a simple sensation of cold to a spontaneous gangrene of the extremities. Kokott (1935) investigated five cases; no evidence of Buerger's disease was discovered, nor had any symptoms of this kind been detected in the cases observed by Mr. Juler.

Duke-Elder (1940) stated that Eales's disease was the commonest type of tuberculous periphlebitis, but that it may also occur as the result of septic foci, Buerger's disease, helminthiasis, delay in blood coagulation time, endocrine defects, and calcium deficiency. "The main feature in most cases is the normality of the general metabolism."

With regard to tuberculosis, the absence of clinical evidence in most cases is definite, but cases in which there were active pulmonary lesions were reported by Bonnet, and others (1936), and Kokott (1935), while Somerville-Large (McArevey and Large, 1939) saw three cases of Eales's disease with old-standing tuberculous lesions in the hilar glands. Microscopic examination was not possible, but Fleischer in an excised eye found a single focus of inflammation in the ciliary body, hemorrhages along the retinal veins and on the retinal surface, with tuberculous nodules in the venous walls. Gilbert (1935) found tubercle bacilli in a nodule in the wall of a vein; the eye had been excised for secondary glaucoma in a young man suffering from severe pulmonary tuberculosis: it was not a typical case of Eales's disease but it proved that tuberculous periphlebitis does occur.

From Mr. Juler's personal observations the appearances in the fundus are in the

most cases obscured by the grossness and density of the vitreous opacity, but in some of the less-severe attacks it is possible to see the apparent origin of the hemorrhage and in others a residue can be seen when the hemorrhage has cleared.

Mr. Juler presented eight cases in which there was a striking absence of any tangible general disease, except in one in which there was a chronic osteomyelitis of the great trochanter.

In no case was any evidence of tuberculosis obtained. This was in contrast to the findings in a recent study of chronic iridocyclitis (Brooks and others, 1940) in which clinical or radiologic evidence of tuberculosis elsewhere in the body was present in 25 of the 40 patients. Another negative feature was the absence of any general tendency to phlebitis or venous thrombosis.

On the contrary, all the patients except the one with bone disease were physically and mentally in good health. Possible sources of sepsis, such as tooth or tonsilar pockets, were not found during routine examination. Investigations concerning a possible hyperpituitarism and vitamin deficiency had not been carried out. In only one case was the blood pressure above the normal for the age of the patient; there was no increase in the color density detected in the routine blood counts, such as might have been found if a posterior-lobe hyperfunction had been present.

In three of the series of eight cases, iridocyclitis was present and foci of choroiditis were found in one other. The iridocyclitis was nonrecurring and for the most part of a mild type.

The ophthalmoscopic study of this series suggested that in many the hemorrhage occurred from one or more branches of a retinal vein, and that recurrence may have derived from the same site, leaving little residue beyond a twisting and kinking of the vessel, sometimes associated with a localized traction forward of the retina. It has been recorded by several observers that occasionally no change can be found in the fundus after the vitreous has cleared. This has led to the suggestion that a diapedesis rather than a loss of continuity supplies the actual hemorrhage.

Although some eyes are undoubtedly badly damaged, the majority retain good vision. In many of the cases reported in the literature and in those which form the basis of this report, hemorrhages do not recur after a varying period. In Hutchinson's cases (1932) this was from six months to four years.

Of the cases reported by Mr. Juler, only one had been watched a sufficient length of time to be certain that there was no further danger. In that patient, seven years had elapsed since the last hemorrhage, which was one of five over a period of three years. In another, the right eye had many relapses over a period of five years, finishing with an iritis, and has been free for 13 months. His left eye had suffered several hemorrhages during a period of 11 months and has been free for 8 months. Two others have been free for eight months, one after five hemorrhages in 5½ years, a second after four hemorrhages in 1½ years. The intervals between the attacks vary from a few weeks to three years, but the average is approximately nine months.

One may conclude that in the great majority of attacks the visual acuity is only temporarily impaired, but that there is always danger of a serious attack during the period of susceptibility. Even after these severe attacks the eyes have a fair chance of good recovery.

Treatment consists of complete bed rest for a few days at the onset, in order to help clotting at the site of the rupture.

None of the coagulant drugs appears

to be of any value. Intravenous injections of calcium gluconate and chloride in one of Mr. Juler's cases were not followed by any shortening of the coagulation time. In the same way hemoplastin and vitamin K cannot be expected to be of value. The hemorrhage is not due to any deficiency in the coagulation power of the blood, it must be due to the local lesion in the vessel wall.

The general well-being of the patient is most important. The ideal is a sheltered life, with plenty of sleep, good food, and gentle exercise. In the background is the prevention of recurrences. The periphlebitis or perivasculitis in the area concerned is usually of a mildly infective nature, but any definite focus may require radical treatment. Apart from this, it may be well to attack the infection by general empirical means, such as protein-shock therapy by means of the intravenous injection of T.A.B. vaccine. Such treatment might stop further infection, although it need not be expected to strengthen the resistance of weakened walls.

The other possibility of stopping recurrences is by diathermy. In his Bowman lecture, Weve (1939) pointed out many uses for the high-frequency treatment, and in certain cases of Eales's disease it might be suitable to application. The patients in some of Mr. Juler's cases appeared to have bled from the same vessel on succeeding occasions. It would seem justifiable to produce a reaction over the area affected so as to include the "phlebitis sector" in the ensuing scar. A surface application would suffice, and if it were within 14 mm. of the limbus the ensuing defect in the visual field should not be large.

The treatment of vitreous hemorrhage is uncertain if the hemorrhage is very great. The clearing does not seem to depend on age, for, Mr. Juler states, he has seen an improvement of vision from the perception of hand movements to 6/18 in three weeks' time in a 67-year-old woman who had a mild degree of hypertension.

Organization of vitreous hemorrhage by endothelial proliferation frequently does occur, and the pathology of formation of blood cysts in the vitreous was recently demonstrated by Wolff before the Ophthalmological Society of the United Kingdom. Once these fibrous walls and bands have developed, they will remain, and indeed detachment of the retina is known occasionally to result.

In the present series vitreous aspiration has been used on one occasion only, and with a resulting iritis and detachment of the retina; however, in the treatment of traumatic vitreous hemorrhage it is certainly useful. With a preliminary surface diathermy at the site of the puncture, the danger of hemorrhage is reduced, while detachment should not occur if the puncture is made at the "site of election"—namely, the pars plana—at a point 6.5 to 7.5 mm. from the limbus.

With such precautions, in the treatment of vitreous hemorrhage from pathologic causes there should also be some improvement.

As an alternative to aspiration Weve (1939) has suggested diathermic puncture of the sclera following a local surface coagulation; if necessary, a certain amount of fluid can be sucked or pressed out. It is indicated after traumatic or operative hemorrhage, and in vitreous opacities due to chronic inflammation.

Other methods of treatment for the clearing of severe hemorrhage are: (1) short-wave diathermy, (2) subconjunctival or retro-orbital injection of hypertonic saline. The latter is probably of no value, whatever, except for psychologic reasons.

NEW YORK SOCIETY FOR CLINICAL OPHTHALMOLOGY

November 2, 1942

Dr. Isadore Givner, *presiding*

Exhibit on neuro-ophthalmology

Dr. Donald J. Lyle presented an exhibit that illustrated graphically the effect of brain diseases on the eyes. The diseases studied included neoplasms, diseases of the blood vessels, and various types of inflammations.

Retinal chronaxia in health

Dr. Benjamin Friedman presented a paper on this subject which will be published in this Journal.

Relationship of the cerebrospinal-fluid system to ophthalmology

Dr. Donald J. Lyle outlined the embryologic development of the brain, in which the neural tube undergoes vesiculation in the parts of greatest growth. These vesicles, which are called ventricles, are joined, and through them the cerebrospinal fluid passes, finally to reach and bathe the cerebral surface. The ventricles are molded by central visual paths and other ophthalmologic structures which are frequently implicated in lesions of the cerebrospinal-fluid system.

Hydrocephalus, caused by an excess of production of cerebrospinal fluid, a defect in absorption, or a blockage of its flow by tumors, inflammations, blood clots, or other causes, frequently produces choked discs, visual-field changes, and involvement of the sensory and motor nerves to the eyes and adjacent structures.

Lesions in the temporal and occipital horns of the lateral ventricles frequently produce visual-field changes by implicating the optic radiations. Lesions involving the third ventricle frequently affect the optic tract and chiasm at the anterior end, which affection may be due to a blockage of the aqueduct of Sylvius at the posterior end.

The nuclei of the nerves to the eye muscles are subject to lesions in the aqueduct of Sylvius and the fourth ventricle as they lie in the ventricle wall.

The emerging nerves in their course through the subarachnoid spaces from the brain or brain stem to the orbits may also be affected by inflammation and pressure from tumors, blood clots, and other causes.

The cerebrospinal-fluid system in its relationship to neuro-ophthalmology is of paramount importance, and clinical ophthalmologists should have a working knowledge of this subject.

Discussion. Dr. Alfred Kestenbaum stated that the dura is partly divided into two layers, a parietal and a visceral one. Three intermeningeal spaces may be thus differentiated: (1) the subarachnoid space between the pia and the arachnoidea; (2) the subdural space between the arachnoidea and the visceral dura; (3) the "epidural" space between the visceral and the parietal layer of the dura. In the spinal canal there are, as a matter of fact, these three well-separated spaces.

In the skull the subdural space is normally only a virtual one. The subarachnoid space is known as the cisternae—as, for example, the cisterna of the optic chiasm—and is filled with cerebrospinal fluid. The intracranial part of the optic nerve, the chiasma, and the optic tracts run through the subarachnoid space as do all large basal arteries, except the internal carotids. In contrast to the arteries, the entire venous system—the sinus at the convexity as well as the system of the cavernous sinuses—lies in the "epidural" space. The cavernous-sinus system and the hypophysis are separated by the visceral dura from the optic chiasma. This has the following significance: the

so-called intracranial pressure is present only in the subarachnoid space and within the brain. The venous-sinus system, however, situated in the epidural space, is protected by the dense dura; the pressure on the venous vessels is therefore more independent of the intracranial pressure (Sabanski). Otherwise in instances of highly increased intracranial pressure the blood from the orbit could not enter the skull at all. Therefore Sabanski, who found the diastolic pressure in the retinal veins (measured by Bailliart's ophthalmodynamometry) to be almost equal to the intracranial pressure, had to explain this fact by the relation of the vein to the subarachnoid space in the optic nerve, and not by the pressure relations in the cavernous-sinus system.

The difference in the pressure-conditions between the "epidural" space, in which the hypophysis is situated, and the subarachnoid space, which continues into the sheaths of the optic nerve, has to be considered in the explanation of the fact that tumors of the hypophysis almost never cause a choked disc.

The subarachnoid space and the subdural space, but not the "epidural" one, continue into the optic nerve up to the lamina cribrosa of the disc. Therefore the subarachnoid space of the optic nerve is in open communication with the subarachnoid space of the skull, as Tsuboi has emphasized. The pressure in the subarachnoid space of the optic nerve is therefore almost identical with the intracranial pressure and with the pressure found on lumbar puncture (in the recumbent position). The lamina cribrosa virtually separates two pressure spaces: the intracranial (better subarachnoid) space and the intraocular space. If the lamina cribosa were a very elastic membrane, its position would be a direct expression of the relation between intracranial and intraocular pressure. On increasing the former or decreasing the latter it should advance; on increasing the latter it should be bent backward. The small degree of elasticity of the lamina hinders such an extensive bending, but this point deserves attention in the explanation of many facts: the advancement of the lamina in papilledema, which Duke-Elder emphasizes; the occurrence of "papilledema" after perforation of the eyeball; the sometimes observed decrease or even disappearance of an excavation in recent cases of glaucoma after decrease of the tension; the dependence of the pressure of the retinal veins on the intracranial pressure (Baurman); the mechanism in primary optic atrophy according to Sabanski and Lauber.

In conclusion Dr. Kestenbaum stressed the facts that (1) the orbital veins open into the "epidural" space, which is relatively independent of the intracranial pressure; (2) the hypophysis lies in a "pressure-space" other than that of the optic pathways; (3) the lamina cribrosa of the disc forms a thin separating wall between two pressure-spaces, the intraocular space and the subarachnoid space, and therefore between the intraocular pressure and the intracranial pressure.

Dr. Ralph I. Lloyd stated that Dr. Lyle had shown the importance of the ventricular system in the diagnosis of brain conditions. Several theories have been offered to explain choked discs but the most reasonable, it seems, is Oppenheim's. He claims that the fluid escape from the ventricles into the submeningeal spaces is blocked by pressure upon the narrowest part, the iter. Distension of the third ventricle ensues, producing pressure upon the optic chiasm immediately below. This pressure blocks the return flow of lymph along the perineural spaces of the optic nerves, which, in turn, inhibits the flow of venous blood in the optic nerve anterior to the bony canal where the central artery

and vein enter and depart. Lantern slides were shown in support of this theory. The first showed a tumor of the cerebellopontine angle, tumor in place, and the second, the effects of the pressure it exerts upon the cerebellum, resulting in marked atrophy of the lobe of the affected side. The next two slides showed the dilated third ventricle in this case and the normal ventricle. The next two slides showed the petrous portion of the temporal bone from this case with the atrophy of the bone about the auditory-nerve entrance and also a normal petrous bone. Dr. Lloyd pointed out that in brain tumors with choked disc there is no great quantity of fluid escape when the meningeal membranes are opened. The pent-up fluid is in the ventricles, and a trocar introduced preferably into the extremity of the posterior horn of the lateral ventricle allows this to escape and is the usual practice in operations to lower the pressure.

The pupillary reflex to darkness

Dr. Otto Lowenstein stated that, until 1939, it had generally been supposed that the same mechanism was involved in the pupillary reflex to light as in the reflex to darkness; that is, the response to a short interval of darkness of a pupil that has been adapted to light. In that year, Lowenstein and Franceschetti showed for the first time that the two reflexes are independent of one another.

The reflex to darkness is elicited clinically by two flashlights, so arranged that the light from each flashlight reaches only one eye. After a short period of adaptation to these lights, one of them is extinguished for about a second. This "darkness stimulus" produces a reaction consisting of three phases: a primary phase of dilation, a contraction phase which begins after the darkness stimulus comes to an end, and a third phase of redilation in which the normal pupil regains its original width. The reaction takes place both directly and consensually. As compared to the light reflex of the same individual, the dimensions of the reflex to darkness are considerably less. In a person, for example, whose contraction to light amounts to three millimeters, the dilation to darkness amounts to only two-thirds of a millimeter. During the darkness period, the reaction to darkness can be observed only clinically in the consensually reacting eye; pupillographically, the reaction of both eyes can be recorded during the entire period of reaction.

In cats, the reaction to darkness is as great as the reaction to light. The redilation phase, however, is not found; this is also true of monkeys, rabbits, and pigeons. It is of interest that in pathologic conditions in man, the phase of redilation disappears more readily than do the other phases.

In pathologic cases, any phase of the darkness reflex may be absent, independently of the other phases, and independently, too, of the reaction to light. For example, one might find cases in which good contraction is manifested in the light reaction but the redilation is inhibited, whereas the reflex to darkness shows a good dilation phase, and vice versa.

A case is shown in which, after the surgical removal of a pinealoma, the light reflex was absent; the reflex to darkness, however, was exaggerated in its first phase (dilation) although the third phase (redilation) was absent. This shows dissociation of the nervous pathways of pupillary control for the reaction to light and to darkness. We are not able to state the exact location of the lesion, for no anatomic evidence is present, but there must exist at least one point in the brain where the pathways of the two reflexes are not identical.

Discussion. Dr. Otto Marburg gave a review of the pathways for pupillary reflexes. He emphasized that the anterior median nucleus proper only (not the vertical limb of Edinger-Westphal's nucleus) is the motor nucleus for the light reflex. Edinger-Westphal's nucleus is a sympathetic nucleus, and as new investigations with Mettler on cyclopian brain have shown, no fibers from this nucleus enter into the oculomotor nerve. The fibers of this nucleus cross the side and enter into the tegmentum, thence running into the spinal cord. As for the dark reflex, the exact investigations of Lowenstein are convincing. In the retina there are solely cones and rods (that is, color and light receptors); there may be a receptor also for darkness. But in the receptor layer of the calcarine area there are only two different kinds of cells: light and color receptors as revealed by investigations on monkeys that see by night only. (Vogt, Henschen's studies on Perodicticus Potto.) It may be that there is a similar mechanism as for sleep (two different centers for falling asleep and for awakening), but that remains to be proved.

Dr. Mark J. Schoenberg presented a series of pupillographic curves from cases of glaucoma. These curves brought out a number of anomalies some of which were: (1) a slight disturbance of the first phase and a marked disturbance of the second phase, (2) the second phase is very similar to that found in normal monkeys.

Dr. Isadore Givner pointed out the value of the reaction to darkness in differentiating Adie's phenomena from the Argyll Robertson pupil. There are two types of darkness reflex in Adie's disease. The first shows the dilation to darkness but no subsequent contraction and redilation. The consensual reflex to this reaction when the affected eye is stimulated is normal. When, however, the nearer normal eye is stimulated the dilation to darkness in the affected eye is also diminished; there is, as well, an absence of the contraction and redilation following. The second type shows no reaction at all in the affected eye and a markedly reduced darkness dilation effect in the consensually acting eye. When, however, the nearer normal eye is studied, there is a diminution in dilation to darkness in this eye and an absence of reaction in the affected eye. Dr. Lowenstein believes that actually both eyes are affected in Adie's disease though one eye is outstandingly so. In the Argyll Robertson pupil there is no reaction to darkness either directly or consensually, whether or not either eye is stimulated by darkness.

Ocular manifestations of intracranial pathology

Dr. E. A. Spiegel discussed the local-diagnostic significance of visual disturbances, eye-muscle palsies, and of nystagmus caused by intracranial pathology. He found, with N. Scala, that there is a second type of central vertical nystagmus, besides that seen in lesions of the vestibular nuclei. This second type of vertical nystagmus appears in the acute stages of cerebellar lesions, particularly in certain positions of the head, and is considered to be the result of a release of vestibulo-ocular reflex arcs from cerebellar inhibition. This result may shed some light upon the controversial question whether nystagmus occurs in cerebellar lesions. There seems to exist general agreement that cerebellar tumors or abscesses affecting the vestibular nuclei by pressure or edema may induce nystagmus. It is, however, a moot question whether nonspace-taking lesions that are restricted to the cerebellum may cause the appearance of nystagmus. Some authors admit this possibility, others deny it. The present series of experiments

seems to confirm the former opinion, since we observed nystagmus in cerebellar lesions with the vestibular nuclei and their extracerebellar pathways histologically intact. These experiments further showed that cerebellar nystagmus may escape observation if one examines in the normal position of the head only, so that the examination for nystagmus in cerebellar lesions should routinely include the observation of the eyeballs in the normal as well as in abnormal positions of the head.

Discussion. Dr. Alfred Kestenbaum stated that two kinds of vertical jerky nystagmus are generally known. In one group a lesion of the region of the colliculär plate is found anatomically, in the other group a lesion of the superior part of Deiter's nucleus. The first kind may be explained as a gaze-nystagmus—a disturbance of upward gaze, as paralysis of gaze may also occur in a lesion of the collicular region; the second kind may be explained as a central vestibular nystagmus. The interesting results of the experiments of Spiegel would show the existence of a third kind of vertical jerky nystagmus as a consequence of a cerebellar lesion, if such a nystagmus were observed clinically, too.

Dr. Frank C. Keil stressed the importance to the ophthalmologist of Dr. Spiegel's contributions pertaining to the central connections and pathways of the ocular nerves. He cited briefly a few case reports of lesions of the ocular nerves of unverified etiology and stated that it was not always possible to follow the different phases of ocular palsies, as the true cause of a lesion may become manifest only months or years later.

Jesse M. Levitt,
Secretary.

AMERICAN JOURNAL OF OPHTHALMOLOGY

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THE OPHTHALMOLOGIST'S ROLE IN THE PROGRAM FOR THE PARTIALLY SEEING CHILD

The book by Winifred Hathaway on "Education and health of the partially seeing child" is reviewed in this issue of the Journal. The program is in its infancy, not having been initiated in the United States until 1913. Only a small part of the estimated 50,000 eligible children have as yet been enrolled in sight-saving classes. There has been a diversity of opinion as regards the amount of vision desirable for enrollment in this program, the upper limit of acuity in some states being 20/70 whereas in others it is as low as 20/200 in the better eye with suitable glasses. Only the phases of this subject referred to in the title of this editorial are here considered.

The ophthalmologist enters into the picture in two different roles. He is primarily the most important factor in the selection of pupils for these classes. Secondarily, his must be the continued supervision of the patients if they are admitted to the classes. Superficially the task of selection and bringing about the inclusion of the desired children into sight-remedial classes seems simple. Actually, however, this is not the case, there being an inher-

ent disinclination on the part of the parents to have the child segregated in any manner from his fellows, to say nothing of the mechanical difficulties of transportation and added expense. From the doctor's standpoint it is important that he shall be convinced of the value of these sight-conservation classes or he will make a poor salesman.

The first screening must usually be done in the schools. This requires the education of school personnel or of the school physician in the matters of vision taking and of the significance of sight-conservation classes. After defective vision is found the child is usually referred to a refractionist. In some places this must be a physician, but in others optometrists are acceptable to the school boards. Whatever the instructions, parents often take their children to optometrists, so that they also must be aware of the sight-conservation program and of its merits.

It is advisable to be prepared to combat parental objections, which are almost sure to arise, by elimination of the probable points at issue in advance. For example, the child should not be segregated completely from his fellows, but should recite as much as possible with his own class and be in the special classroom only for those studies to which conservation of eyesight especially pertains. For athletics and other nonsight-taxing pursuits these children should be with their classmates, since it is important that they do not get the point of view that they are handicapped and segregated. In this regard it is vital that children with defects other than ophthalmic be not included in these groups. For example, it is never wise to send the mentally defective child to such a class merely to get him out of the way because he is a nuisance in the normal group.

Transportation is a real problem. In order to accompany the younger child it is sometimes possible to have an older child transferred to a school in which there is a sight-saving class for the younger child with defective vision. In some cities school busses are available. The expense, if it cannot be borne by the family, should be provided for by the city.

Everything should be done to take away any possible stigma connected with enrollment in these classes. The ophthalmologist should know of the program in his own community and be interested in seeing that it is being conducted in as intelligent and efficient a manner as possible.

Regarding the question of what children should be enrolled in the classes, it is relatively simple to ascertain the best vision with glasses. But there is a divergence of opinion regarding such matters as myopia. Many doctors believe that the child with marked myopia should be in a conservation-of-sight class, irrespective of whether the vision is below that of the allowable limit in his community or not; whereas others do not share these views as to the ill effect of use of the myopic eye. Such points as these will have to be decided in the individual case by the examining physician. An ophthalmologist who is wholeheartedly in favor of the program (and it is incredible that any well-informed doctor should be otherwise) will be more successful in persuading the parents that the child in question should have the benefit of these classes. Usually, the parent is entirely unaware of the sight-saving classes and has to be convinced of their value. The first reaction is almost always one of opposition to them, and this is especially true if the child is doing well in his school work. It is generally only when the grades begin to fall and the child in becoming a misfit that the reluctance of the parents for such classes is overcome. It is very often difficult to convince parents in the former case of the value of the class in protecting the child's vision for the future.

The physician's task is greatly helped

if a certain amount of favorable propaganda is carried on by the school board. An attractive method of doing this is the portrayal of the classes and their work in the rotogravure section of Sunday papers. In most cities there are parent-teacher associations. Lectures to them on this subject would be very helpful in popularizing the effort. The objections are usually from ignorance rather than from any other factor.

The care of the child when entered into these classes is no different from that of a partially seeing child under any circumstances. The only feature that need be stressed is the necessity of systematic ocular examinations, as the condition of the child's eyes may change relatively rapidly. Frequent reëxaminations in the schools are necessary also. The entire program is a very worthy one and will be greatly helped by the active participation of the ophthalmologist.

Lawrence T. Post.

GLAUCOMA AND NASAL SINUSES

Concerning the mechanism of certain cases to which we attach the diagnosis of "secondary glaucoma" we know a little. With regard to the causation and development, particularly in the earlier stages, of the disorder to which we apply the title "simple glaucoma" we know almost nothing.

The expression "simple glaucoma" implies more or less that we are dealing with an insidious type of glaucoma for which we are unable to establish a cause.

It would be encouraging to suppose that we could assign a clearly defined and well understood cause to this disease. Proof of such a discovery would constitute one of the greatest modern advances in the science of medicine. This would be particularly true if the cause discovered were of such a nature that the cause could be corrected or remedied, and that such remedial action would either prevent or cure simple glaucoma.

It is interesting to reflect that as soon as (if ever) we find such a cause, or perhaps a related group of causes, we shall have to discontinue the use of the term "simple glaucoma" and must regard every case of glaucoma as secondary. Simple glaucoma is among a number of conditions (as for example essential vascular hypertension) whose titles are confessions of ignorance.

Many attempts have been made to trace a connection between simple glaucoma and various types of focal infection. The incriminated sources have included the teeth, the tonsils, the nasal sinuses, the gall bladder, the genito-urinary tract, and the large intestine. Infection existing in any one of these areas has been more or less frequently blamed upon another of the group, an example being the attribution of sinus disease to dental granulotomata.

Last year, before the American Academy of Ophthalmology and Otolaryngology, Berens and Nilson (Transactions American Academy of Ophthalmology and Otolaryngology, 48th meeting, 1944, January-February, page 121) discussed evidence which seemed to them to point to the nasal accessory sinuses, among other foci of infection, as playing a prominent part in the etiology of so-called chronic simple glaucoma. These authors urged more particularly that, if it could be shown that a large proportion of cases of simple glaucoma occurring in one eye only, or especially marked on one side, coexisted with nasal-sinus disease on the same side, this fact would constitute a strong ground for assuming a causal connection between the two conditions.

It is stated that of fifty-three cases included in the study, in nineteen the glaucomatous condition was more marked in

the left eye and the evidence of nasal involvement was either confined to the left side or more pronounced on that side. In eighteen cases there was suggested a similar relationship on the right side.

Especially in view of recent researches with regard to the viruses, it seems not unreasonable to suppose that many inhabitants of the so-called temperate zone who have been severely or frequently attacked by influenza or the common cold are likely to nurture a chronic and perhaps lifelong, although usually inactive, infection of the nasal sinuses. Moreover, an extremely mild and hardly recognizable infection of one kind or another has often been shown to be capable of just as much secondary mischief as an active and more clearly demonstrable infection.

Thus the field of investigation upon which Berens and Nilson have set out lends itself much more readily to somewhat vague conjecture than to positive demonstration. The difficulties with which the subject bristles are vigorously illustrated in Woods's discussion of the paper of Berens and Nilson. The authors of the paper themselves admit that "the difficulties of proving a definite relationship between the simultaneous occurrence of sinus disease and chronic simple glaucoma from the experimental or even the clinical standpoint seemed to be unsurmountable."

Judgment concerning the relationship between glaucoma and any focal infection is rendered difficult by the fact that the essential degenerative changes more directly responsible for the glaucoma are likely to be permanently established before the causative factor can be investigated, recognized, or removed. A further difficulty in establishing the chain of evidence is the fact that the glaucoma, once established, must be persistently treated with miotics or combated with a surgical operation.

There is a definite possibility that the only causal connection between what we call simple glaucoma, on the one hand, and chronic sinusitis or other focal infection, on the other hand, is through their common relationship to a degenerative process in the reticulo-endothelial system. Such a degenerative tendency might owe its existence to one or more acute or chronic infections, or might itself have created a reduced power of resistance in the patient. From this point of view, the problem of preventing simple glaucoma may be tantamount to the difficult task of finding a means for the cure or prevention of essential degenerative changes in the body as a whole, and particularly in its endothelial circulatory structures, including the canal of Schlemm.

W. H. Crisp.

BOOK NOTICES

EDUCATION AND HEALTH OF THE PARTIALLY SEEING CHILD. By Winifred Hathaway. Clothbound, 182 pages, 26 plates, 9 figures. Published for the National Society for the Prevention of Blindness, Inc., New York, Columbia University Press, 1943. Price $2.50.

This is an excellent book on this subject. It covers most of the important aspects and is quite readable. For most ophthalmologists it will contain information that will be valuable and is not readily available to them.

The volume is divided into four parts. I. Ten pages about the historical background. II. This, the longest chapter, is on administrative responsibilities. III. Educational responsibilities. IV. Community social service responsibilities. Lastly, appendixes, a comprehensive series of chapters on diverse subjects closely related to the main thesis of the book; such as, Facts about the eye and Eye hy-

giene; Vision testing, a screening process; Outline for checking lighting facilities and equipment for eye work in the class room. A good bibliography and index complete the work.

As a guide for establishing sight-saving classes this book will serve as a satisfactory outline. The author indicates the different types of classes that are possible in order to meet the varying requirements of diverse communities. Details such as equipment and costs are given. The necessity of coöperation of the ophthalmologists for the success of the program is pointed out.

Lawrence T. Post.

REMEDIAL TECHNIQUES IN BASIC SCHOOL SUBJECTS. By Grace M. Fernald. Clothbound, 349 pages, with 49 illustrations. New York, McGraw-Hill Book Company, Inc., 1943. Price $2.75.

This book by Dr. Fernald, associate professor of psychology at the University of California at Los Angeles, has for its objective primarily the report of certain psychologic experiments in the development of skills in the basic school subjects of reading, writing, spelling, and arithmetic. The outstanding contribution is the presentation of the author's methods for overcoming "word-blindness." Her phenomenal success in this field has been well recognized for many years, and doctors and educators alike will welcome this long-awaited compendium of her methods and results.

There are hundreds of thousands of nonreaders and partial reading-disability problems in the elementary schools of this country. The children affected with this condition are usually possessed of normal intelligence and often superior mechanical skill, and should become our finest citizens. Instead they develop serious negative emotional reactions to school because of constant failure in school work, and finally a definitely antisocial attitude.

The problem becomes of special import at this time, as the majority of cases are found in males possessing the very characteristics needed in war activities, but who, upon application for admission to the Army, are excluded or classified as illiterates. A survey of Dr. Fernald's cases, presented as part VI of this book, reveals that many adults coming to her at 17 and 18 years of age responded almost miraculously to her method of teaching. Her success should be a challenge to educators for early recognition of cases meriting application of remedial technique, and a plea for more extensive training of teachers of remedial reading for children and adults alike.

Every ophthalmologist should read this report, for any child who becomes a reading problem is likely to be referred to an ophthalmologist in hopes of finding some visual defect that may account for inability to learn to read. The ophthalmologist must not feel that his responsibility ends with a declaration that the child's eyes are not a factor in the reading difficulty. He should become sufficiently well acquainted with Dr. Fernald's work to advise the child's parents and teachers as to the seriousness of their negligence if they do not insist on remedial reading for the child, and to instill into the child and the parents absolute confidence that the handicap can be cured.

Instructive to ophthalmologists is Dr. Fernald's discussion of eye conditions that may affect reading skills, and of eye movements in reading. Her conclusions become authoritative by virtue of her clear thinking and her serious consideration in the cases she has studied of any relation between eye conditions and learning. She has found many individuals with

monocular vision, nystagmus, involuntary spastic head-jerking, and so forth, who read with a high degree of speed and comprehension provided the mechanism of the eye is such as to give a clear retinal image.

Dr. Fernald's supreme skill in simplifying material heretofore presented in a complicated and complex manner makes this treatise easily comprehendible and enjoyable reading, and thereby of incalculable value.

For instance, her description of her method of teaching reading is so clearly and concisely reviewed as to be apprehended by every interested teacher and the average parent.

Dr. Fernald says: "All authorities agree that the causes of reading disability are numerous and vary from case to case. Certainly our results with both children and adults suggest that no one specific disorder is responsible for the seeming inability of some individuals to read. Such conditions as poor vision or hearing, illness, or other physical disabilities, poor homes, poor schools or other unfavorable environmental conditions, extreme emotional instability, mental deficiency, or other mental maladjustments have long been recognized as respossible for reading failures. In most of these cases, individual work and correction of the faulty condition result in normal learning. Many of these cases can be treated successfully in a schoolroom by the use of accepted techniques, provided the child is given special attention in a small group with a strong teacher. After we have eliminated all cases due to the foregoing conditions, we still have a residue made up of individuals who fail to learn under the most careful instruction by methods that are successful with the average child."

She then discusses the techniques found successful in treating such cases.

The general plan of procedure in teaching these children to read is, first, to tell the child that many bright people have had the same difficulty he has and have learned to read by a new method which he may try. He selects any word he wants to learn. It is written for him with crayola on paper in plain blackboard-size script or print. The child traces the word with finger contact. This kinesthetic approach is the key to the situation. Learning is much more rapid when the word is traced with finger contact than when a pencil is used. The child says each part of the word as he traces it, repeating the tracing process until he can write the word without looking at the copy. As soon as the child realizes he can learn to write words, he starts "story writing." In extreme cases the child must learn by the tracing method every word to be used in his story. He asks for any words he wishes to use, learns them, and writes his story. After a story has been written it is typed for the child and he reads it in print. The child files away in his alphabetical word file the words he has learned and used.

After a variable period of tracing the child develops ability to learn new words easily without tracing. His stories become longer and more complicated. They are always typed for him and read by him. Soon he can learn from the printed word by looking at it and saying it before writing it. He recognizes difficult words after once writing them. He begins to want to read books. He is told words he does not know and writes them to learn them. Soon he makes out new words from their resemblance to words he already knows. Then he is eager to read, and delights in his ability to recognize new words without being told what they are.

Dr. Fernald's remedial technique for Mirror Writing is simply to start the child at the left edge of the page, so that the only direction in which his hand can

move with the pencil on the paper is left to right. If the child is left-handed she says, "You write with your left hand. Always start at the edge of the page on the same side as your hand." If the child is right-handed she says, "You are right-handed. Always start on the edge of the page on the opposite side from your hand." The child soon becomes accustomed to placing his pencil at the left edge of the page. He has no difficulty in reversing his inverted writing after establishing the initial position, and the mirror writing disappears within a few days.

Dr. Fernald has been equally ingenious in her analysis of difficulties in spelling and mathematics, and in devising ways of overcoming these difficulties. We cannot expect every teacher, even heeding scrupulously Dr. Fernald's suggestions and admonitions, to be as skillful as Dr. Fernald in handling these problems, but an attempt at understanding and applying her remedial techniques should be demanded of every individual responsible for the training of children in basic school subjects, for Dr. Fernald presents convincing proof that all difficulties in learning to read, spell, write, or figure, in a child of normal or superior intelligence, can be removed or compensated for if the proper technique is employed. An important influence in the direction of solution of this great problem may come from the ophthalmologists' interest and advice to the parents and teachers of these children.

To quote in conclusion from the Foreword by Prof. Lewis Terman of Stanford University: "Perhaps the most important conclusion to be drawn from the extensive researches here reported is that disability of any degree in any of the basic school subjects is wholly preventable. If educational methods were more intelligently adapted to the idiosyncrasies of the individual child, all children could achieve up to their mental age level in all school subjects. It is largely for this reason that I believe this book is one of the most significant contributions ever made to experimental pedagogy."

S. Rodman Irvine.

OBITUARY

ADOLPH O. PFINGST

1869-1944

Dr. Adolph O. Pfingst was born in Louisville, September 8, 1869. After

Adolph O. Pfingst

graduating from high school in Louisville and securing a B.A. from the University of Louisville, he entered the medical de-

partment, from which he obtained his medical degree in 1891. Competitive examination awarded him the appointment of resident in the Louisville City Hospital, where he spent a year in rotating service. He then filled an unexpired term on the surgical staff of Mt. Sinai Hospital, New York, before going to Europe to take up the study of ophthalmology.

After a year of work in the laboratories at Marburg, pursuing the study of pathology under Professor Marchand and bacteriology under Prof. Carl Fraenkel, he began his studies in ophthalmology under Professors Uhthoff and Axenfeld. In 1893-1894 he was assistant to Professor Schweiger in the University Eye Clinic in Berlin. While there he wrote his thesis and obtained a "Doctor of Medicine" from the University of Berlin.

In 1895, Dr. Pfingst became assistant to Prof. Herman Knapp and house-surgeon to the New York Ophthalmic Institute for a year. He then established himself in Louisville, Kentucky, as an ophthalmologist and associated himself with bacteriologic and histologic laboratories. He established a reputation as a dynamic instructor and was popular with the student body. In 1906, he was promoted to the chair of Professor of Ophthalmology and Director of the Eye Clinic at the Louisville City Hospital. He retired from active teaching in 1938, when the title of Professor Emeritus was conferred upon him.

Dr. Pfingst was a fellow of the American College of Surgeons and was also a member of the American Ophthalmological Society; the Academy of Ophthalmology, Otology, and Laryngology; member of the International Society of Ophthalmology and the Pan-American Congress of Ophthalmology. He also held membership in the American and Southern Medical Associations, the Kentucky State and Jefferson County Medical Societies, and was active in various medical clubs in Louisville. He was instrumental in organizing the Kentucky State and the Louisville Eye and Ear Societies, each of which he served as president.

Dr. Pfingst was always interested in civic affairs of his home town and was organizer of the first sight-saving class in Louisville; he was active in the national movements for the prevention of blindness.

He contributed to scientific medical literature, his interest being especially centered on pathologic studies of the eye and on diseases and anomalies of intracranial blood vessels.

Since 1930 Dr. Pfingst has had Dr. C. Dwight Townes associated with him in his surgical and office work.

Dr. Pfingst had one daughter, Katherine, who died in 1918. He is survived by his wife, Mrs. Lula Pfingst.

Irwin Abell.

CORRESPONDENCE

1944 Meeting of the Los Angeles Research Study Club

Editor, American Journal of Ophthalmology:

The thirteenth annual Post-Graduate Clinical Course of the Research Study Club of Los Angeles was held January 17th to 29th. Registrants for the course numbered 311, among them 52 service men; 31 states were represented.

The visiting teaching staff for ophthalmology included Dr. James Watson White, who gave the principal lectures of the Eye Course on "Motor anomalies"; Dr. Georgiana Dvorak Theobald, who reviewed certain aspects of "Eye pathology"; Dr. Meyer Wiener and Dr. Frederick Carl Cordes, who gave instructions and demonstrations on "Surgery of the

eye"; Dr. George Hosford, who assisted Dr. White in the instruction courses, demonstrating muscle cases; and Mr. Irving Lueck of Bausch and Lomb Company, who lectured on "Optics of ophthalmic lenses," "Cross cylinders," "Lighting and colored lenses," and "Selection of bifocals." The main otolaryngologic speakers were Dr. Isidore Friesner, Dr. Gordon B. New, Dr. Arthur W. Proetz, Dr. Samuel Salinger, and Dr. Carl H. McCaskey.

Again this year, following the John Finch Barnhill tradition, a course in "Applied anatomy and cadaver surgery of the head and neck" followed the regular course, January 28th to February 1st.

The large attendance, in spite of wartime inconveniences, justified the attitude of the Research Study Club that postgraduate teaching should be continued during the war years as a means of insuring the best possible medical protection to the country.

It is hoped that the lectures of the principal speakers will be available for publication in the Journal.

Dr. White's course brought to the Research Study Club the Duane school of thought on ocular muscles. In some respects this differs from Bielschowsky's teachings, which were presented in this course in 1938. Combining the ideas from both these authorities will lead to a broader understanding of muscle problems. Dr. White empasized the use of the cover test and the screen comitance test. He does not rely upon the measurement of diplopia for diagnosis, as did Bielschowsky, but instead neutralizes with prisms the movement of the eyes brought out by the cover test in the six cardinal positions. No one is as responsible for popularizing this objective method for measuring eye deviations as is Dr. White. In addition he has simplified recording of these deviations, so that muscle tests are not so complicated nor time-consuming as previously.

Dr. White does not rely on the head-tilting test to differentiate oblique from vertical recti involvement, as did Bielschowsky. His explanation of double hyperphoria as being involvement of corresponding vertical muscles in the two eyes, differs from that of Bielschowsky, who considers this phenomenon as supranuclear innervational disorder. This disparity in ideas relative to use of the head tilt in diagnosis of oblique abnormalities, and the origin of double hyperphoria, offer fields for confirmatory investigation.

As the various types of anomalies were discussed, with their infinite variations, the lecturer's intimate personal contact with the solution of muscle problems was appreciated by those in attendance in proportion to their experience in muscle work. It was extremely instructive to hear Dr. White discuss specific cases such as have worried all of us as one who has encountered the problem many times and considered and treated it from varied points of view. In summary, the course stressed the practical side of muscle work. Consequently the sensory aspect of motor anomalies, as abnormal retinal correspondence, inhibition, and amblyopia, were but briefly touched upon.

In the reviewer's opinion the outstanding lectures by Dr. Theobald were those on the "Anatomy and histology of the anterior segment of the eyeball with reference to the canal of Schlemm," on "Eye infections," and on "Intraocular tumors." Dr. Theobald demonstrated her serial sections, showing direct communications from the anterior chamber through the canal of Schlemm to the vascular system about the extraocular muscles.

Her discussion of the use of calcium gluconate in eye infections was new to many of us and will add to our therapeutic armamentorium.

Her classification of intraocular tumors as to malignancy will be of definite benefit to members of the Course in decisions as to the prognosis in and treatment of such cases.

Dr. Wiener and Dr. Cordes demonstrated, along with other operative procedures, Dr. Wiener's operation of forming a union between the levator and superior-rectus muscles for correction of ptosis.

Mr. Irving Lueck's interesting lectures on optics were extremely practical, easily understandable, and are available in reprint form.

This annual Course is unique in that it is designed to attract the general eye, ear, nose, and throat practitioner who is seeking a solution to his everyday problems, as well as the academic-minded specialist to whom it affords an opportunity to meet world-known authorities and discuss with them, through the arrangement of courses and entertainment, the particular interests or problems he has in mind.

S. Rodman Irvine.

THE FORM AND CHARACTER OF ROD SCOTOMETRY

AIR COMMODORE P. C. LIVINGSTON

(Concluded from page 353)

early stage in vitamin-A deficiency (fig. 5). This condition has been recorded while the subject continues to provide a normal adaptometer curve. This divergent result seems explainable on the grounds that while with the adaptometer a selected patch of retina is subjected to the test, with a screen a wide area is examined by means of a moving target. The question of movement which increases the spread of the threshold visual sensation must be regarded as of significance.

Pathologic features. It will suffice to illustrate the field appearances of one pathologic condition (fig. 6). In cases of diabetes, small lozenge-shaped scotomata appear, dotted irregularly about the field. This is accentuated under states of reduced-oxygen tension. There appears to be a close association between the scattered areas of deficiency revealed on the screen and the nutritional disturbances in the retina that are brought about through capillary embarrassment.

SUMMARY

Scotometry, employing self-luminous test objects and a red fixation light, appears to reveal defects in the central field of vision which cannot readily be found by customary procedures. It is well to confine this method to the 30-degree screen. Up to this point, it is possible to work with very low luminosities, such as 4×10^{-9} or 6×10^{-9} candle power, without introducing physiologic effects likely to be confused with early pathologic conditions. Further work is being undertaken to improve equipment and technique, so as to establish normal field characteristics.

R.A.F. Kelvin House, Cleveland Street.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is mentioned only in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy, embryology, and comparative ophthalmology

1

GENERAL METHODS OF DIAGNOSIS

Kronfeld, P. C., and McGarry, H. I. **Present limits of gonioscopy.** Amer. Jour. Ophth., 1944, v. 27, Feb., pp. 147-153. (One table, references.)

Pitman, L. K. **A combined ophthalmoscope and retinoscope.** Arch. of Ophth., 1943, v. 30, Nov., pp. 667-668.

The author describes the construction of an instrument that can be used as either an ophthalmoscope or a retinoscope. (One illustration.)

R. W. Danielson.

2

THERAPEUTICS AND OPERATIONS

Arjona, J. **Subconjunctival autohemotherapy.** Arch. de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Aug., pp. 140-155.

One c.c. of blood taken from a vein in the patient's arm is injected beneath the bulbar conjunctiva in various allergic and inflammatory affections of the eye. The blood is absorbed within 6 to 15 days. Several injections may be necessary. Beside the curative effect the striking relief of pain is an important benefit. The injections have been found very efficacious in tuberculous keratitis, trachomatous pannus, rheumatic iritis, scrofulous keratoconjunctivitis, and reactions of sensitivity to atropine and eserine. In the latter it has been possible to continue the use of atropine or eserine after an injection. Conditions not benefited were hypopyon ulcer, luetic interstitial keratitis, and tuberculous, traumatic, or postoperative iritis. With the blood injected locally, the author argues that the circulating antibodies are brought to bear directly on the eye.

J. Wesley McKinney.

Atkinson, W. S. **Local anesthesia in ophthalmology.** Arch. of Ophth., 1943, v. 30, Dec., pp. 777-808.

The history of the use of local anesthetics in ophthalmology is reviewed. General conditions affecting anesthesia are discussed, including the distribution of sensory nerves to the orbit and the mental attitude of the patient and surgeon. After describing the various local anesthetic agents, the author concludes that tetracaine is the best drug

for surface instillation and that procaine is the most suitable for injection. The effect of procaine injection is improved by the addition of epinephrine.

Detailed directions are given for the production of intradermal wheal, nerve block, and field block. Retrobulbar injection into the muscle cone, block of the infraorbital nerve, block of the infratrochlear nerve, facial akinesia, and so forth are explained. The appropriate methods of anesthesia for the commoner ophthalmic operations are described. Techniques are described in such detail and with such a practical approach that the article should be of value even to ophthalmic surgeons of long experience. (16 illustrations, bibliography.)

John C. Long.

Bieltiukova, A. A. **Roentgen therapy of some ocular diseases.** Viestnik Oft., 1943, v. 22, pt. 2, pp. 35-40.

A review of the literature, and a report of the author's clinical investigations on 45 patients. Roentgen therapy was found very effective in chronic tuberculosis of the anterior ocular segment. The initial dose was 10 to 20 percent of the erythema dose, and three or four treatments were given at intervals of 12 days. An acute reaction lasting several days after the treatment was frequent. In some cases, immediately after the irradiation, there developed around the inflammatory focus transitory gray streaks, radiating from the center toward the periphery. The effects of the treatment included subsidence of inflammatory phenomena, visual improvement, and absence of recurrence. Twenty patients with other diseases were subjected to this form of therapy. It was ineffective in trachoma, in traumatic iridocyclitis, and in leukoma. It checked suppuration in the vitreous in a case of traumatic endophthalmitis, but the eyeball went on to atrophy. In two cases of secondary glaucoma this treatment relieved the pain. A fistula of the lacrimal sac closed after irradiation. Ray K. Daily.

Buxton, R. **Anesthetics for ophthalmic operations.** Trans. Ophth. Soc. United Kingdom, 1942, v. 62, pp. 179-182.

The author insists that the aim of anesthesia is to reduce fear and apprehension to a minimum, and to abolish pain, without incurring risk to the eye or to the patient. Premedication is indicated to lessen apprehension as well as to aid in the effect of the local anesthesia. In cataract operations, facial-nerve block is advised, as well as subconjunctival injection at the points of fixation. In acute glaucoma or acute iritis a pledget of cotton soaked in 5-percent cocaine with adrenalin and placed on the conjunctiva preliminary to the subconjunctival injection has aided anesthesia a great deal. In detachment of the retina the patient should receive extra sedation, and repeated local instillations as may be necessary to continue a painless operation. For dacryocystectomy, careful injection of the infraorbital and infratrochlear nerves is advised.

Beulah Cushman.

García Miranda, A. **Alterations of refraction in the course of sulfonamide therapy.** Arch. de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Sept., pp. 305-307. (See Section 3, Physiologic optics, refraction, and color vision.)

Green, E. W. **The present status of sulfonamides in ophthalmology.** The Mississippi Doctor, 1943, v. 21, July, p. 35.

In the treatment of bacterial diseases

sulfonamides aid principally by their bacteriostatic action. Following oral administration, the concentration of sulfadiazine in the aqueous seems greater than that of sulfanilamide or sulfathiazole, but the latter increases in the presence of ocular infection. Sulfonamides are excreted by the kidneys, sulfapyridine in its acetylated form being responsible for renal calculi. Toxic effects vary from cyanosis and gastric upsets to fever, rash and leukopenia.

Oral sulfonamides are employed by the author in severe cases of acute conjunctivitis. They have unquestioned value in gonorrheal conjunctivitis, but their exact role in trachoma is somewhat in dispute, with most observers agreeing that there is clinical improvement. Favorable results have been obtained in inclusion conjunctivitis, blepharitis, corneal ulcer, and cellulitis of lids and orbit. The merit of these drugs in other ocular diseases has not been so clearly demonstrated.

Benjamin Milder.

Kravitz, D., and Duest, L. J. **Postoperative endogenous infection of the eye with recovery.** Amer. Jour. Ophth., 1944, v. 27, Feb., pp. 167-171. (References.)

Marin Amat, M. **Mercurochrome in ophthalmology.** Arch. de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Aug., pp. 156-162.

A glorification of mercurochrome as a specific preventive and cure for all suppuration infections of the conjunctiva and cornea.

J. Wesley McKinney.

Marin Amat, M. **The sulfonamides in ophthalmology.** Arch. de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Sept., pp. 297-304.

This is a review of the use of the sulfonamides in several ophthalmologic conditions.

Potter, W. B. **Visual impairment during tryparsamide therapy.** Arch. of Ophth., 1943, v. 30, Nov., pp. 669-687. (See Section 11, Optic nerve and toxic amblyopias.)

Stewart, R. A. **The use of naphthocaine as a local anesthetic in ophthalmology.** Amer. Jour. Ophth., 1944, v. 27, Feb., pp. 178-179. (References.)

3

PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Allen, M., Flack, F., and Billings, M. L. **Three pedigrees of eye defects.** (Nystagmus and myopia.) Jour. of Heredity, 1942, v. 33, Dec., p. 453. (See Section 17, Systemic diseases and parasites.)

Argañaraz, R. **Chromatoscopic case for the diagnosis of color blindness.** Arch. de Oft. de Buenos Aires, 1942, v. 17, May, p. 247.

To overcome the inadequacy of the Holmgren and Edridge-Green color tests, and to avoid the patient's memorizing the Stilling-Ishihara plates for the detection of color blindness, the author presents a chromatoscopic case of his own design. It consists of a box with two holes, the borders of which are painted with pure spectral red and green. There are twenty-four beads giving different hues of red and green and also confusion colors. During the test the patient drops the beads through the holes of matching color, and the results can be quickly observed by examining the beads fallen in the compartments under the two respective holes. (Color illustration.) Plinio Montalván.

Burian, H. M. **Influence of prolonged wearing of meridional size lenses on spatial localization.** Arch. of Ophth., 1943, v. 30, Nov., pp. 645-666.

When a meridional size lens is placed with its axis at 90 degrees in front of one eye of a normal observer, the retinal image of that eye is enlarged in the horizontal meridian. Since horizontal disparity of the retinal images is responsible for stereoscopic effects, the observer will experience typical changes in the appearance of his environment. The author planned the present work to answer the following questions: What happens to the appearance of space and to an observer's functioning within space when a meridional size lens is worn constantly for a certain length of time? Do the spatial distortions of the normal surroundings remain unchanged? Does the rotation of the horopter curve remain the same? Does the capacity of compensating for artificially introduced meridional aniseikonic errors exist?

Experiments are reported in which three observers wore a meridional size lens at axis 90 degrees in front of one eye for 8 to 14 days. After a technical discussion of the data, the author concludes in part as follows:

When a person with normal binocular vision places a meridional size lens at axis 90 in front of one eye and wears this lens for several days, he at first experiences a typical distortion of his surroundings. The longer the lens is worn, the less the distortion is noticeable, and it finally disappears and is absent as long as the observer remains within roundings abounding in perspective and other uniocular elements.

However, if the number of effective perspective factors in the surroundings is negligible, the distortion recurs immediately, and measurements made with instruments from whose field of view these factors are absent show that the larger part of the image size-difference is still present, no matter how long the size lens has been worn. But there is an average decrease in the effectiveness of the size lens of from one fifth to two thirds as measured with these instruments. This decrease in effectiveness could be due either to a process of actual physiologic compensation, leading to a redistribution of the stimuli on the retinas, or to a psychologic reinterpretation of the relation of objects in space under the influence of uniocular clues in the surroundings and of memory values of past experience. (10 figures, 5 tables, references.)

R. W. Danielson.

Butler, T. H. **Forty-eight years of refraction.** Trans. Ophth. Soc. United Kingdom, 1942, v. 62, pp. 247-255.

The author emphasizes that the object of refraction is to make the patient comfortable, not to solve a problem in optics, yet he also states that an infant with poor acuity will probably become unobservant and develop unsocial habits.

Some of the difficulties brought out relate to the necessity of examining the macular area to get the proper reading in the retinoscopic examination, the danger of insufficiency of cycloplegia when this is used, and the necessity of checking the binocular vision with the correction and adjusting accordingly for the final prescription. (One graph.)

Beulah Cushman.

Cotlier, I. **Applications of the stenopaic slit in refraction.** Arch. de Oft. de Buenos Aires, 1942, v. 17, May, p. 266.

The author discusses at length the optical principles of the stenopaic slit,

which he finds of practical value in measuring the refractive error and in determining whether an ametropic eye has been accurately corrected with lenses. (Diagrams, bibliography.)

Plinio Montalván.

Cotlier, I. **The velonoskiascope.** Rev. Oto-Neuro-Oft., 1942, v. 17, Jan.-Feb., pp. 13-21.

This instrument of refraction, not in general use in this country, is based on the observations of Holth, who noted that when a needle was slowly moved before an ametropic eye which was fixing a light at 5 meters, a shadow formed whose · movement depended upon the type of refractive error present in the examined eye. The shadow takes the form of the needle, and does not exist in an emmetropic eye. If the eye is hypermetropic and uncorrected, the movement of the shadow is against the movement of the needle; the opposite is true of myopia. In simple astigmatism a shadow exists only in the axis of the astigmia and may be removed by placing a correcting cylinder before the eye. In cases of compound astigmatism and mixed astigmatism, corresponding findings obtain with regard to the movement of the shadow —against in hyperopia and with in myopia.

Instead of Holth's primitive apparatus, the author has devised a compact instrument, the velonoskiascope (from the Greek word for a needle), which consists of a stand, a round, revolvable disc with meridian-finders, and a central illuminated slit covered with milk glass. With this instrument and trial lenses he can determine both spheric and cylindric corrections. One of the disadvantages of the apparatus is that it requires a high degree of coöperation by the patient. However, it has the advantage of minimizing any error due to an examiner's possible inexperience, of utilizing macular vision, and of being more refined than the simple skiascope, especially in cases of scissors movement, miosis, and small corneal or lenticular opacities.

Edward Saskin.

Crozier, W. J., and Wolf, E. **Theory and measurement of visual mechanisms. 9. Flicker relations within the fovea.** Jour. Gen. Physiology, 1943, v. 27, Nov., pp. 119-138.

The investigation described in this highly technical article aims to determine flicker recognition contours within the human fovea with reference to light-time fraction (t_L) and wave-length composition as controlled parameters, and also considers the areas and form of the test patch. It deals further with conclusions arising from the study of reasonably homogeneous data on flicker recognition as a function of flash frequency and flash cycle form, flash intensity, image area and form, retinal location, wave-length composition of the light, and the fraction of the cycle-time occupied by light.

The authors state that "white" must be regarded as a synthesis, not a mere summation, of effects due to different spectral regions. Attention is called to certain differences between foveal and more peripheral regions tested, and as between observers differing in the degree of the "yellow spot effect," with regard to the relative effects of wave-length and of image area.

W. H. Crisp.

Dunlap, Knight. **Mental maladjustment and color vision.** Science, 1943, v. 98, Nov. 26, p. 470.

Since a number of cases of parachromopsia (so-called "color-blindness")

were found among persons who gave a history of dietary insufficiency, especially lack of meat in the diet, and since neurotic stammerers are (according to the author) usually not meat eaters, the author was interested in testing the color vision of persons suffering from neurotic maladjustment. Twelve neurotics were selected for the color-vision test. The Ishihara charts and Lohen's revision of the Nela tests were used. Of the 12 only one was found to have completely normal color vision.

The author further criticizes the present method of color-vision examination at close range, whereas the practical requirements call for recognition of color at a great distance. The author, moreover, postulates that color vision should in general be tested under conditions similar to those in which the colors are used. R. Grunfeld.

Gamble, R. C. **High congenital myopia with convergent strabismus.** Amer. Jour. Ophth., 1944, v. 27, Feb., pp. 159-160.

García Miranda, A. **Alterations of refraction in the course of sulfonamide therapy.** Arch. de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Sept., pp. 305-307.

A 26-year-old man was given 22 grams of the sulfonamide "uliron" over a period of 17 days. After 24 hours his vision became suddenly blurred, being reduced to O.D. 1/6 and O.S. 1/8. The corneal astigmatism was 0.5 diopter each eye, as measured by the ophthalmometer, and remained the same for the duration of the disturbance. Refraction revealed O.D. −2.00 sph. −2.00 cyl. ax. 60° = 1.0, and O.S. −2.00 sph. −2.00 cyl. ax. 120° = 1.0, unchanged by repeated instillation of atropine. Administration of uliron was discontinued and within four days the vision was 1.0 each eye without correction. The disturbance apparently resulted from absorption of the sulfonamide by the lens.

J. Wesley McKinney.

Lister, A., and Bishop, J. W. **Night vision in the Army.** Brit. Med. Jour., 1943, Sept. 11, p. 325.

The results of 10,333 tests for night vision on high-category men between the ages of 18 and 55 years are tabulated. Though the test is one of form sense, it appears that the minimum light necessary for discrimination of a simple form is in the region of the absolute light threshold. Classification illustrates the downward trend of scotopic vision which occurs with advancing years. This point is more of theoretic interest since the drop from the average at 18 to that at about 44 years is only in the region of 3 micromillilamberts. Owen C. Dickson.

Luckiesh, M., and Taylor, A. H. **Visual acuity at low brightness-levels.** Amer. Jour. Ophth., 1944, v. 27, Jan., pp. 53-57. (2 figures, references.)

McFarland, R. A., Hurvich, L. M., and Halperin, M. H. **The effect of oxygen deprivation on the relation between stimulus intensity and the latency of visual afterimages.** Amer. Jour. Physiology, 1943, v. 140, Dec., pp. 354-366.

The relationship between the latency of visual afterimages and stimulus intensity during exposure to various atmospheric oxygen tensions is shown in tabulated form. These data are based on six experimental sessions employing three trained subjects. Each session consisted of a series of measurements in normal air followed by repetitions during anoxia; and finally 100 percent

oxygen was administered and observations repeated after recovery intervals.

The conclusions reached are that the effect of oxygen deficiency on the latent time of the "tertiary" visual afterimage, measured in a low oxygen chamber over a wide range of stimulus intensities, shows that in normal air there is an inverse relationship between the latent time of the afterimage and the intensity of the stimulus, reduction of the intensity of the stimulus prolonging the latency of the afterimage. Anoxia prolongs the latency of the afterimage. Complete recovery of the latent time upon administration of oxygen may require up to fifty minutes and the apparent brightness of the visual field is restored to normal within three to four minutes. The behavior of the visual mechanism is believed to reflect changes in the central nervous system, since the retina is embryologically a part of the central nervous system and resembles it metabolically and anatomically. Slowness of recovery of the function is therefore indicative of a similar delay in the recovery of other central nervous functions. This emphasizes the importance of the use of oxygen by airplane personnel at high altitudes as a preventive measure, before any appreciable effect of anoxia occurs. The possibility that some central nervous functions recover slowly after anoxia suggests that certain factors contributing to landing accidents at sea level after high altitude flights without an adequate oxygen supply may be attributed to the residual effects of lack of oxygen. Melchiore Lombardo.

Miles, W. R. **Color blindness in eleven thousand museum visitors.** Yale Jour. Biol. and Med., 1943, v. 16, Oct., p. 59.

By Ishihara charts, 7.1 percent of eight thousand men were found defective in color vision, and 1.3 percent of three thousand women were similarly defective.

Six grades of color defect were proposed, arranged in order of diminishing defect from group I to group VI. Group IV includes typical dichromates and extreme anomalous trichromates. The author suggests that groups I to IV ought to be disqualified for service with the air force, whereas groups V and VI should be relatively safe risks. Groups I and II are entirely unsafe where recognition of colored signals is important. The author states that pseudo-isochromatic charts presenting colored forms of the vanishing pattern type on neutral gray backgrounds of similar brightness constitute a rapid practical means for determining degrees of color defect.

Robert N. Shaffer.

Obrig, T. E. **A new ophthalmic impression material.** Arch. of Ophth., 1943, v. 30, Nov., pp. 626-630.

The satisfactory fitting of contact lenses became a possibility when it was discovered that molds of the living human eye could be made with negocoll. However, negocoll has certain disadvantages and the present paper deals with the author's experience with a new medium called moldite powder—for which the manufacturer refuses to divulge the formula. It is an alginate gelling agent which reacts when mixed with distilled water. The gelling is retarded by a preparation which gives sufficient time for the material to be placed on the eye and the molding shell centered before the gelling takes place.

The many advantages of moldite

powder over negocoll are well outlined and the technique of its use is given in orderly and meticulous detail. (2 figures.) R. W. Danielson.

Orton, S. T. **Visual functions in strephosymbolia.** Arch. of Ophth., 1943, v. 30, Dec., pp. 707-711. (See Section 12, Visual tracts and centers.)

Pascal, J. I. **A new approach to cross-cylinder tests.** New York State Jour. Med., 1943, v. 43, Feb. 15, p. 323.

For every astigmatic eye in a state of rest, one spherical lens gives better visual acuity than any other spherical correction. This "spherical equivalent" represents that correction in which Sturm's conoid straddles the plane of the retina so that a round diffusion circle is focused on the retina—a state of equally mixed astigmatism.

If an eye is so corrected that it is placed in such a state of equally mixed astigmatism as mentioned above, then the cross cylinder may be used to best advantage in determining the presence of, and axis of, astigmatism. In such a condition, the patient appreciates differences in the two positions of the cross cylinder by differences in the size of the diffusion circles.

One table in the paper illustrates the fact that the difference in size of diffusion circles is greater, the stronger the cross cylinder used (providing it is held so that one axis of the cross cylinder is at or very near the axis of astigmatism), until one reaches a cross cylinder equal in cylinder strength to the existing astigmatism. Under these conditions, there will be a maximum diffusion circle in one position, and none at all in the other position. Thus one should use a stronger cross cylinder. The difference in size of circles decreases as the cylinder axes become more obliquely inclined to the axis of astigmatism, until at 45 degrees to the astigmatic axis there is no difference.

Using this same "spherical" approach for determining the axis of astigmatism, the best effect is obtained by the use of correcting cross cylinders, as well as the testing cross cylinder. As the cylinder strength increases (both correcting and testing), the difference in size of diffusion circles increases. One table shows the results obtained with a fixed combination of 0.25 correcting cross cylinder and 0.50 testing cross cylinder. This combination proves to be satisfactory in most cases. Within 5 or 10 degrees, however, a more exact method would be the use of a testing cross cylinder half the strength of the correcting one. This step may be used, as a final check on the axis, after the cylinder strength has been determined.

For determining the amount of astigmatism, a stronger cross cylinder is preferable, in early stages of the test, utilizing correcting cross cylinders to maintain the same spherical equivalent.

Benjamin Milder.

Pember, A. H. **Presbyopic analysis.** Dis. Eye, Ear, Nose, and Throat, 1942, v. 2, Dec., p. 364.

In addition to a proper refraction, measurement of accommodation convergence and interpupillary distance is considered of great importance in giving comfort to wearers of presbyopic corrections. Methods used in these determinations, other than the actual refraction of the patient, are described. The prismatic effect of certain lenses is discussed briefly.

Most refractionists are said to overcorrect their patients for near use. The author discusses a modification of the

use of the ampliometer with reference to additions for near use of the eyes.

F. M. Crage.

Pett, L. B. **Riboflavin and vitamin A in relation to "eye strain".** Canadian Med. Assoc. Jour., 1943, v. 49, Oct., pp. 293-295.

A three-months study was made on 232 men and women whose vocation was reading handwriting under normal lighting conditions and who complained of "eye strain." The ages varied from 20 to 70 years. Conjunctival opacities as seen with the biomicroscope constituted apparently the sole evidence of vitamin-A deficiency, and blood vessels crossing the limbus between the 5 and 7 o'clock positions were the sole evidence of riboflavin deficiency. The large group was divided into three equal small groups. One group received a capsule of 10,000 i.u. of vitamin A daily; the second, 3 mg. of riboflavin daily; the third, a capsule containing inert matter. The patients did not know the nature of their medication. In no case was the diet supposed to be changed. In the vitamin-A series, as judged by the above biomicroscopic criteria, 12 percent of those with deficiencies improved after three months of 10,000 i.u. of vitamin A daily. In the riboflavin series, 57 percent of those with deficiencies improved after treatment, but 47 percent improved without any treatment. Charles A. Bahn.

Prado, Durval. **Concerning Márquez' biastigmatism.** Arquivos Brasileiros de Oftalmologia, 1943, v. 6, June, pp. 100-104.

The author briefly indicates the nature of Márquez' technique. The astigmatic test is begun by measuring the corneal astigmatism with the ophthalmometer and then using skiascopy and subjective tests to measure separately the "residual astigmatism." The author remarks that many ophthalmologists have convinced themselves of the necessity for prescribing one-eighth diopter intervals, whereas some large manufacturers of correcting lenses do not make lenses having such intervals.

W. H. Crisp.

Salvatori, P. L., and Oriani, A. **The fitting of contact lenses.** Arch. of Ophth., 1943, v. 30, Dec., pp. 763-766.

Molded plastic contact-lenses must often be adjusted to fit the individual eye. The authors have worked out a method of making these adjustments according to plan. In the fitting of contact lenses, one must bear in mind the convergence of the eyes, the pressure of the lids, and the effect of gravity. To compensate for these factors, a contact lens should be fitted so that the corneal portion will be decentered upward and turned slightly toward the nose. When fitted correctly the lens should rest uniformly on the sclera without constricting the blood vessels. There should be no tight or loose areas.

The contact lens is first checked for over-all size. Instructions are given for trimming away the margins if they exceed the fairly definite size limitations. Rotation is studied after marking the lens with a horizontal line, and is controlled by relieving excessively tight areas or by tightening loose edges. Tight or loose areas are detected by instilling fluorescein and suitable correction is obtained by grinding with a grit-impregnated rubber point on a dental machine. Optical centering is determined after marking the pupillary center on the plastic while the lens is in the eye. A blue-print-like record of the corrective markings is made in every case. This is an indispensable aid

to the fitter, serving as a permanent record and as a basis for planning necessary adjustments. Much time is saved and a more comfortable fit is obtained by following a definite plan rather than by free trial-and-error methods. (2 color plates.)

John C. Long.

4

OCULAR MOVEMENTS

Allen, M., Flack, F., and Billings, M. L. **Three pedigrees of eye defects.** (Nystagmus and myopia.) Jour. of Heredity, 1942, v. 33, Dec., p. 453. (See Section 17, Systemic diseases and parasites.)

Argañaraz, Raul. **Nystagmus. Conjugate deviations of paralyses of the conjugate movements in diseases of the brain.** Arch. de Oft. de Buenos Aires, 1942, v. 17, March, p. 113.

The author reviews the anatomic basis and the mechanism of the production of nystagmus, of conjugate deviations and of paralyses of the conjugate movements of the eyes; discussing their diagnostic significance. The literature on the subject is also reviewed. (Bibliography.)

Plinio Montalván.

Argañaraz, Raul. **Study of opticokinetic nystagmus as a means of diagnosis.** Arch. de Oft. de Buenos Aires, 1942, v. 17, June, p. 323.

The mechanism of opticokinetic nystagmus is discussed and its diagnostic value is emphasized. It is abolished in lesions of the oculomotor centers and pathways, and in the optic tracts and visual cortex. Plinio Montalván.

Burri, Clara. **The use of prisms in orthoptics.** Amer. Jour. Ophth., 1944, v. 27, Jan., pp. 61-66. (References.)

Dolph, C. H. **The cover test as an aid to diagnosis in extraocular muscular anomalies.** Texas State Jour. Med., 1943, v. 38, Feb., p. 612.

Dolph calls attention to the cover test. Because of its simplicity it is often neglected. T. M. Shapira.

Foster, C. B. **A new suture for use in muscle-recession operations.** Amer. Jour. Ophth., 1944, v. 27, Jan., pp. 71-72.

Gamble, R. C. **High congenital myopia with convergent strabismus.** Amer. Jour. Ophth., 1944, v. 27, Feb., pp. 159-160.

Grieve, J., and Archibald, D. H. **Some facts and figures relating to heterophoria in symptom-free individuals.** Trans. Ophth. Soc. United Kingdom, 1942, v. 62, pp. 285-293.

The authors report on a study of heterophoria in a selected group of air recruits between the ages of 17½ and 30 years. Out of 7,019 men examined, 53 percent showed lateral, vertical, or both deviations, and only 1.3 percent complained of symptoms. Voluntary convergence was found in 30 percent of 1,268 recruits examined.

The second part of the paper gives results of an investigation into the incidence of convergence insufficiency among normal school children. Of 104 children examined, 8 percent showed heterophoria, and 58 of these children had voluntary convergence. In comparing the development of the child intellectually and emotionally with the above findings, out of 58 children with perfect voluntary convergence 30 were considered normal, 17 intellectually retarded, and 11 unstable. Of the 46 without the power of voluntary convergence 14 were regarded as normal in

all ways, 8 intellectually retarded, and 24 unstable.

The third part of the paper deals with findings in a group of retarded children. Of the 86 examined, 52 did not have full voluntary convergence. Of these, twenty were intellectually retarded and 32 emotionally unstable.

Facts of special interest are the disparity between the number of individuals showing phorias and the number with symptoms, the high incidence of poor voluntary convergence in all groups, and the high incidence of esophoria for distance and of exophoria for near among adults.

Beulah Cushman.

Hermans, T. G. **Torsion in persons with no known eye defect.** Amer. Jour. Ophth., 1944, v. 27, Feb., pp. 153-158. (One table, 3 figures, references.)

Kobrak, F. **Studies on vestibular nystagmus.** Jour. Laryng. and Otol., 1943, v. 58, May, p. 167.

The author describes his studies carried on with weak caloric stimulus on the labyrinth in preference to the rotatory test, and he discusses his observations on latent nystagmus. These experiences may serve as a diagnostic aid for detection of abnormalities of the acoustic nerve. R. Grunfeld.

Krimsky, Emanuel. **Fixational corneal light reflexes as an aid in binocular investigation.** Arch. of Ophth., 1943, v. 30, Oct., pp. 505-520; also Trans. Amer. Acad. Ophth. and Otolaryng., 1943, 47th mtg., March-April, p. 269.

Ocular deviation and binocular imbalance may be measured in a controlled and graded objective manner by artificial restoration of the corneal light reflexes to their fixation positions. Artificial restoration, or centering, of the corneal light reflexes may be carried out with prisms, the anglometer, the phorometric sterioscope, or the synoptophore.

The amount of deviation in a squint may be measured by the strength of prism required to center the corneal light reflexes. It is not intended that this determination replace the familiar cover test. The observation of the light reflex is also of value in objectively determining the amount of prism convergence and divergence, in measuring heterophoria, in distinguishing a heterophoria from a heterotropia, in measuring squint with severe amblyopia, and in demonstrating malingering. In addition, the fixational corneal light reflexes are helpful in the objective study of the near point of convergence, ocular dominance, primary versus secondary deviation, ocular torticollis versus sternocleidomastoid torticollis, the range of monocular movements, binocular fixation, abnormal retinal correspondence, and pseudostrabismus. (12 figures.) John C. Long.

Malbrán, Jorge. **Paralysis of the inferior rectus muscle.** Arch. de Oft. de Buenos Aires, 1942, v. 17, May, p. 311.

A 29-year-old woman presented a paralysis of the left inferior rectus muscle following a blunt injury to the orbit. The pupil was dilated and irresponsive to the different stimuli in the affected eye. An atypical torticollis, with the head tilted to the right side, was also present. The author discusses the diagnostic significance of this torticollis and the neural mechanism of the mydriasis, as well as the pupillary response to pharmacodynamic tests. From the use of eserine and pilocarpine, which produced marked miosis in this case, he concludes that the lesion was located behind the ciliary ganglion, and

was probably a traumatic hematoma of the orbit. Myectomy of the paralyzed muscle resulted in disappearance of the torticollis and diplopia. The mydriasis was gradually subsiding. (Photographs, bibliography.)

Plinio Montalván.

Mata, P., and Carrillo, E. **A case of Erb-Goldflam disease (myasthenia gravis).** Arch. de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Sept., pp. 233-250.

The case reported is that of a 14-year-old girl who for the preceding three years had had a mild ptosis of both upper lids of variable degree associated with transient attacks of diplopia. The ptosis was worse in the evening and after exertion. No other muscles were affected although there was a general asthenia with fatigue after much walking. The myasthenic reaction of Jolly was positive. (This test consists in repeated galvanic stimulation of the affected muscles, which in this syndrome show rapid fatigability to the point of complete absence of response to the electrical stimulation.)

The author points out that in most cases of myasthenia there is a disturbance in the metabolism of lactic acid and creatinin with an increase in both blood and urine. In this case, however, there was no increase in the blood lactic acid. Creatinin was markedly increased in the urine. The symptoms were relieved and controlled by glucocol. Prostigmin was not available to the authors. J. Wesley McKinney.

Pascal, J. I. **Nominal duction and true duction power.** Amer. Jour. Ophth., 1944, v. 27, Feb., pp. 179-180.

Prangen, A. D. **Surgical treatment of paralysis of the rectus muscles of the eye.** Proc. Staff Meetings Mayo Clinic, 1943, v. 18, May 19, p. 145.

The author presents a case of bilateral traumatic paralysis of the external recti muscles. Transplantation of the inferior and superior recti, a 13-mm. resection of the external recti, and a 6-mm. recession of the interni were performed. This extensive surgery was well tolerated and resulted in straight eyes, obliteration of the diplopia, and normal excursions. F. M. Crage.

Roth, E. V. **Orthoptics for the infant squinter, one to four years old.** Amer. Jour. Ophth., 1944, v. 27, Jan., pp. 57-60.

Stewart, D. D. S. **A method of evaluation of binocular muscle balance.** Brit. Jour. Ophth., 1943, v. 27, Nov., pp. 477-483.

As a part of all routine eye examinations, estimation of the dynamic ocular equilibrium for distance as well as for near is recommended. Two instruments are described to assist in rapid estimations of muscle balance: (1) a pair of 7-D. prisms, bases out, in a hand spectacle-frame; (2) a spring mount with a thin handle to take a single trial lens (a 2-D. prism). The fixation target used consists of a Snellen chart on a black ground with a white diamond-shaped card above the chart and a white ring and a dot on either side of the chart.

Tests for esophoria, exophoria, and hyperphoria are described. No attempt is made to indicate how an examiner may use the information gained from these tests, since every oculist has acquired by experience an opinion on measures likely to relieve symptoms of visual discomfort. It is the author's opinion that we do not yet appreciate the extent to which selected adult patients can be helped by "eye exercises" of the right kind. (3 illustrations.)

Edna M. Reynolds.

Sugar, H. S. **Guides in the operative (cosmetic) treatment of nonaccommodative concomitant squint.** Arch. of Ophth., 1943, v. 30, Nov., pp. 593-602.

In view of the many variable reports on the amount of correction obtainable by various operative procedures, the author has analyzed 65 operations on the internal and external rectus muscles of male Army personnel, ranging in age from 20 to 49 years. The resection operation used was the Lancaster procedure. The recession operation of Jameson was utilized.

The results cannot be easily abstracted and should be read in full. The average values are fairly consistent. Resection of the internal rectus muscle resulted in more correction than did recession of that muscle. The opposite result was obtained with operation on the external rectus muscle, where recession was generally more effective. Seven-mm. recessions were done in some cases in spite of the fact that it is standard procedure not to do a recession of more than 5 mm. on the internal rectus muscle or of more than 3 mm. on the external rectus muscle.

In convergent-squint cases of the convergence-excess type, recession of the internal rectus muscle should be the primary procedure. For deviations up to 15 prism-diopters, recession of the internal rectus muscle of the deviating eye is recommended. With greater degrees of strabismus, resection of the external rectus muscle should also be done. In the convergence-insufficiency type, for deviations up to 16 prism-diopters resection of the internal rectus muscle of the deviating eye is recommended. For deviations of 16 to 25 prism-diopters resection of both internal rectus muscles or resection of the internal muscle of the deviating eye, and recession of the external rectus muscle of the same eye, depending on the deviations for distance and near vision, are indicated.

In divergent-squint cases of the divergence-excess type, recession of the external rectus muscle of the deviating eye should be the primary operation. In the divergence-insufficiency type, resection of the internal rectus muscle is then the primary operation. Recommendations are also given for the divergence-excess and divergence-insufficiency types. (5 tables, references.)

R. W. Danielson.

Torres Estrada, Antonio. **A new scheme for the diagnosis and recording of paralyses of the extrinsic muscles of the eye.** Bol. del Hosp. Oft. de Ntra. Sra. de la Luz, 1942, v. 2, Jan.-April, pp. 24-30.

After discussion of the subject, and criticism of other schematic methods of recording, the author reproduces his own elaborate diagram and sets forth a series of rules for recognition of the paralyzed muscle or muscles.

W. H. Crisp.

5

CONJUNCTIVA

Bedell, A. J. **Distribution of epidemic keratoconjunctivitis in the United States.** Jour. Amer. Med. Assoc., 1943, v. 123, Dec. 25, p. 1101.

Keratoconjunctivitis has not been found to be epidemic throughout the United States. The West Coast and Hawaii have reported more complications and more extensive ocular involvements than other areas. (One figure, discussion.) George H. Stine.

Cogan, D. G., Kinsey, V. E., and Drinker, P. **Infrared therapy of flash keratoconjunctivitis.** Jour. Amer. Med.

Assoc., 1943, v. 123, Dec. 4, p. 883. (See Section 16, Injuries.)

Smart, F. P., Young, C. A., and Phillips, K. **The treatment of gonorrheal ophthalmia by diathermy in conjunction with sulfonamides.** United States Naval Med. Bull., 1943, v. 41, Nov., pp. 1727-1730.

The authors believe that the superior efficacy of combined general fever therapy and hemotherapy over either alone in the treatment of gonorrheal ophthalmia is no longer debatable. Temperature is not the sole factor in curing these infections, for numerous cases have been cured by temperatures lower than the thermal death-point of the invading organism. Short-wave diathermy ranging from 16 to 30 meters and the ultrashort wave from 6 to 10 meters are used in the Navy. A small pancake coil or drum is employed to produce an electromagnetic field and the ultrashort wave is applied with small condenser-spaced discs. In case of necessity the applications may be given with safety every three hours during the 24-hour day. In the first case reported, long-wave diathermy was repeated every eight hours for three sessions. Sulfa drugs were not used. Improvement was noted after eight hours and recovery was complete.

In the second and third cases 15 grains of sulfathiazole was given every three hours during the 24-hour period, in combination with short-wave electromagnetic treatments lasting 30 minutes every 24 hours for approximately six treatments. Within six hours after the first application, notable subjective and objective improvement was noted. Smears were negative for gonococci after 48 hours, and complete recovery without loss of vision resulted in 12 and 18 days respectively.

Charles A. Bahn.

Sulzman, J. H., and Elliott, C. H., Jr. **Powdered sulfathiazole in treatment of conjunctivitis.** United States Naval Med. Bull., 1943, v. 41, Sept., pp. 1396-1399.

One hundred and sixty-seven persons (apparently domiciled in naval barracks) who had conjunctival redness from various causes were treated by the authors in two groups. Gonorrheal conjunctivitis was excepted. One hundred and thirty-three received an unstated number of instillations of unstated strengths of argyrol and zinc sulphate, and are reported to have had a seven-day average duration. Forty-four of this group were treated with conjunctival applications of powdered sulfathiazole, administered on an ear spoon and preceded by a 1-percent-pontocaine instillation. These had an average duration of only two days. (In trying to understand the astoundingly decreased duration produced by the sulfathiazole powder in such a varied group of cases of conjunctival redness physically and chemically produced, the reviewer wonders how much the discomfort produced by the sulfathiazole stimulated the urge to get well by making the cure more painful than the disease.) Charles A. Bahn.

Torres Estrada, Antonio. **Results obtained in ten years with my personal technique for the surgical treatment of pterygium.** Bol. del Hosp. Oft. de Ntra. Sra. de la Luz, 1942, v. 2, Jan.-April, pp. 4-15.

This author insists upon the importance of excising the hypertrophied episcleral tissue. After separation of the head of the pterygium from the cornea, leaving Bowman's membrane perfectly clear, the head of the pterygium is excised, but without disturbing the neighboring attachments of the conjunctiva to the corneal limbus. The

author then dissects the conjunctiva from the underlying episcleral hypertrophy, and completely removes the hypertrophied episcleral tissue down to the sclera. Hemorrhage must be carefully controlled to avoid the risk of a conjunctival hematoma. A vertical cut upward in the conjunctiva and another vertical cut downward form two V-shaped conjunctival flaps, the upper one of which is carried down into the gap on the corneal side of the lower incision, so as to make an N-shaped scar the angles and lines of which are united by as many sutures as are found necessary in the particular case. Without statistical details, the author claims success in about 95 percent of 163 cases operated upon by this method since 1939. (9 illustrations.) W. H. Crisp.

6

CORNEA AND SCLERA

Arruga, H. **Notes on corneal grafting from the cadaver.** Arch. de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Aug., pp. 163-166.

Arruga discusses a number of problems in connection with corneal transplantation and arrives at the following conclusions: (1) Corneas from cadavers are at least as good as those obtained from the eye enucleated from the living. (2) Although good results have been obtained from eyes preserved for four days, it is logical to expect that the earlier they are used the better the result will be. (3) Heterotransplants always result in opacification. (4) To remain clear, transplants must be placed at least in some part contiguous to relatively normal cornea if nutrition and thus transparency are to be maintained. (5) Postoperative imbibition of tears or aqueous indicates a poor prognosis for the graft. (6) In general the greater the postoperative reaction the greater the opacification of the graft. (7) Myopia frequently results following keratoplasty. (8) Keratoplasty may be performed in inflammatory conditions as soon as the acute phase has subsided and as soon as it is certain that opacification of the cornea will result. Central corneal ulcers and infiltrations may be excised, and with transplantation the period of disability is much shortened. J. Wesley McKinney.

Bedell, A. J. **Distribution of epidemic keratoconjunctivitis in the United States.** Jour. Amer. Med. Assoc., 1943, v. 123, Dec. 25, p. 1101. (See Section 5, Conjunctiva.)

Burch, E. P., and Gewirtz, A. J. **An ocular complication following mechanical fever-therapy.** Venereal Dis. Information, 1943, v. 24, Nov., pp. 330-331.

The frequency of superficial punctate keratitis following mechanical fever-therapy combined with sulfathiazole orally in the treatment of chronic gonorrhea led the authors to experiment with local applications of mineral oil as a preventative. In six patients receiving this general treatment, one drop of mineral oil was placed in the left eye every two hours during the eight hours of fever therapy, the right eye being untreated. Although in several cases the condition appeared in the untreated eye, it never occurred in the eye treated with mineral oil. A larger series of 25 cases was then treated with mineral oil in both eyes as above described. In none of these cases was superficial punctate keratitis observed. The authors believe with Neame that the ocular condition is essentially a virus infection which becomes active after lowering of corneal resistance by dryness and high temperature.

Charles A. Bahn.

Buschke, W., Friedenwald, J. S., and Fleischmann, W. **Studies on the mitotic activity of the corneal epithelium.** Johns Hopkins Hosp. Bull., 1943, v. 73, Sept., p. 143.

The method of obtaining, clearing, staining, and counting fragments of rat cornea to demonstrate mitotic activity of the corneal epithelium is described. Mitotic activity may shed important light on actions of drugs and processes of repair.

Standardization of mitosis counts in normal rats and then following colchicine injection indicates the rate of mitosis. This is possible because of the arrest of mitosis in the metaphase following use of the drug, without influence either on the rate of entrance into mitosis or the velocity of the cycle up to this phase. With this as a basis it was found that ether anesthesia inhibited entrance of corneal epithelial cells into mitosis, and in certain conditions altered the speed of the process.

Locally applied cocaine hydrochloride and ephedrine hydrochloride decrease the entrance of epithelial cells into mitosis. Owen C. Dickson.

Das Gupta, B. K. **Parenchymatous keratitis following riboflavin deficiency.** Indian Med. Gaz., 1943, v. 78, April, p. 198.

A partially albinotic 30-year-old Hindu male had marked deep keratitis of one eye and other local signs. Vascularization of the cornea of the affected eye was entirely absent. Total clearing of the cornea occurred in 29 days after administration of 100 mg. of lactoflavine administered both orally and intramuscularly, the average daily dose being 4 mg. Atropine locally was the only additional therapy. Clearing progressed gradually from the limbal region centrally, suggesting restoration of the vitamin factor from the limbal circulation. Of interest is the fact that at no time was there any sign of corneal vascularization.

Owen C. Dickson.

Mata Lopez, Pedro. **Chemotherapy with compounds of sulfapyridine in serpiginous ulcer of the cornea.** Arch. de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Sept., pp. 286-295.

The author reports his experiences with the use of sulfapyridine by mouth and locally in ointment form in thirty cases of serpiginous ulcer and compares the results with those obtained before the use of the sulfonamides. The percentage of cures was increased from 3 to 5 percent without sulfapyridine to 33 per cent with sulfapyridine.

J. Wesley McKinney.

Nuri Fehmi Ayberk. **About trachomatous pannus.** Göz Klinigi, 1943, v. 1, Aug., p. 13.

The author finds the only efficient local treatment for trachomatous pannus to be 0.5-percent solution of methylene blue combined with atropine. The former drug may have a direct effect upon the trachoma virus and may also help to improve the metabolism of the epithelium of the conjunctiva and cornea. J. Igersheimer.

7

UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Dubourdieu, J., Canabal, E. J., and Gonzalez Vanrell, F. **Wallenberg's syndrome.** Arch. Uruguayos de Med., Cir. y Especial., 1943, v. 22, June, pp. 544-552.

Most of the patients with this rare syndrome die soon, but the patient whose case is now reported lived for

one year. His bulbar lesion produced a limited left hemiparesis, which was accompanied by difficulty in opening the left eye, enophthalmos, and miosis (Bernard Horner syndrome). There was nystagmus on fixation, and the left corneal reflex was abolished. Each eye had good visual acuity. (References.)

W. H. Crisp.

Fralick, F. B., Cooper, J. H., and Armstrong, R. C. **Uveitis with secondary glaucoma.** Trans. Amer. Acad. Ophth. and Otolaryng., 1942, 47th mtg., Nov.-Dec., pp. 92-99. (See Section 8, Glaucoma and ocular tension.)

Kravitz, D., and Duest, L. J. **Postoperative endogenous infection of the eye with recovery.** Amer. Jour. Ophth., 1944, v. 27, Feb., pp. 167-171. (References.)

Rados, Andrew. **Fundus lesions in syphilis.** Jour. Med. Soc. New Jersey, 1943, v. 40, Aug., p. 304.

The pathologic picture of syphilitic lesions of the uveal tract is most commonly found in the choriocapillaris, as against sympathetic ophthalmia in which the deep layers are affected. Pigment epithelium and outer retina are secondarily affected, justifying as more correct the designation of chorioretinitis.

Congenital chorioretinitis, or the typical salt-and-pepper fundus of luetic origin, is about the only characteristic syphilitic lesion. A syphilitic basis for many fundus pictures is assumed from other clinical findings. Vascular pathology due to Buerger's disease, or lesions of Boeck's sarcoid and undulant fever, may require reclassification of signs hitherto described as luetic.

Four types of fundus change in congenital syphilis are described. First, the bilateral, posterior polar or peripheral, delicate yellowish-red dots mixed with tiny pigment spots of the salt-and-pepper type which are nonprogressive. These may occur independently or in association with the other more frequent forms. Types two and four consist of patches of yellowish red occurring in the extreme periphery and measuring about one-half disc diameter. Pigmentary changes are late, and lesions may be unilateral. The severe form of type two may be hard to differentiate from retinitis pigmentosa. In type three the patches are of lighter color and the pigmentation less marked. This type may occur unilaterally and changes progress from the extreme periphery toward the center. Pigmentation may increase in the late stages, giving a picture similar to that of type two and of which perhaps it is merely one modification.

Acquired syphilitic lesions occurring usually in the second stage are described. Emphasis is placed on vitreous exudation, hazy fundus, frequent bilaterality, and the end picture of small, pigment-ringed central lesions progressing to larger areas at the periphery.

Owen C. Dickson.

Ruby, F. McK. **Essential atrophy of the iris.** Amer. Jour. Ophth., 1944, v. 27, Feb., pp. 171-175. (4 figures, references.)

Schlaegel, T. F., Jr. **A comparison of the ocular reactions of pigmented and albino rabbits to normal horse serum.** Amer. Jour. Ophth., 1944, v. 27, Feb., pp. 137-146. (3 tables, 5 figures, references.)

Wienman, G. J. **Sympathetic opthalmitis.** United States Naval Med. Bull., 1943, v. 41, Sept., pp. 1392-1396.

The author believes that at least 17.5 percent of all badly injured eyes, if not removed, will lead to sympathetic ophthalmitis. Enucleation should be performed within two weeks of the ocular injury, as the most dangerous period is between the third week and the third month. The prognosis in advanced cases is poor, and the only good treatment is prophylactic enucleation. Sulfanilamide and foreign-protein therapy appear to be of value, but continued cycloplegia is the greatest single factor in the treatment. There is a great tendency for sympathetic ophthalmitis to undergo remissions and exacerbations. No case can be considered quiescent until at least one year has elapsed. The author reviews four cases of sympathetic ophthalmia seen in civilian practice. The first received a knife wound of the uveal tract, and developed sympathetic ophthalmitis in the second eye after approximately six weeks. Notwithstanding enucleation after the second eye became involved, total blindness resulted. In the second case, the condition followed removal of a lens which had been dislocated when the eye was struck by a baseball. Sympathetic ophthalmitis developed after approximately six weeks, the offending eye being removed at that time. Sulfathiazole, foreign protein, and calcium glucinate intravenously, were administered; the corrected vision ultimately being 20/20. On several occasions during one year, the condition recurred following the discontinuance of sulfanilamide. In the third patient, the manifestation of sympathetic ophthalmitis was an optic neuritis, following a subconjunctival scleral rupture, and involving essentially only the posterior segment of the second eye. In the fourth case, total blindness resulted largely through the patient's lack of cooperation. Charles A. Bahn.

Yanamura, H. Y., and Green, R. G. **Intraocular virus infections.** Science, 1943, v. 98, July 9, p. 45.

The authors have succeeded in experimentally transmitting the virus of epizoötic fox encephalitis by inoculating the virus into the anterior chambers of eyes of dogs, wolves, and foxes. The application of their technique has aided materially the study of this virus infection, because it results in 100 percent of infections which can be followed by gross observation and can be verified by demonstration of inclusion bodies in stained preparations of the corneal endothelium. The clear-cut results have increased knowledge concerning the spines of animals susceptible to fox-encephalitis virus, and open possible avenues of investigation of other viruses which at present can be demonstrated only with difficulty.

Benjamin Milder.

8

GLAUCOMA AND OCULAR TENSION

Fralick, F. B., Cooper, J. H., and Armstrong, R. C. **Uveitis with secondary glaucoma.** Trans. Amer. Acad. Ophth. and Otolaryng., 1942, 4th mtg., Nov.-Dec., pp. 92-99.

Secondary glaucoma in cases of iridocyclitis occurred in 22 percent of 1,282 eyes examined. Medical therapy consisting of mydriatics or miotics or their combination in addition to heat, salicylates, foreign protein, and removal of focal or general infection resulted in normalization of the intraocular tension in 30 percent of the eyes. Paracentesis resulted in normal tension in 43 percent of the eyes when

used in active iridocyclitis accompanied by glaucoma. If paracentesis is going to be successful one or two paracenteses at the most are usually sufficient, and after failure of paracentesis on two occasions some other procedure may better be utilized unless the eye shows active inflammatory changes contraindicating other surgery. Of all operative procedures, iridectomy gave the highest percentage (71) of controlled intraocular tension in iritic glaucoma. If the ocular inflammation is first decreased to a minimum, favorable reduction in tension by iridectomy is enhanced. Corneoscleral trephining was successful in reducing elevated intraocular tension in 60 percent after the iridocyclitis became quiescent. This operation is not indicated in eyes showing active uveitis. Cyclodialysis, iridencleisis, transfixation of the iris, and combined extraction of complicated cataract in quiescent iridocyclitis with secondary glaucoma, resulted collectively in reducing the tension to normal in 62 percent of the eyes operated upon. Sixty-seven (25 percent) of the eyes showing glaucoma after development of primary iridocyclitis were primarily or finally enucleated. (9 tables.)

Gertrude S. Hausmann.

Gradle, H. S., and McGarry, H. I. **Why a glaucoma clinic?** Trans. Amer. Acad. Ophth. and Otolaryng., 1942, 47th mtg., Nov.-Dec., pp. 100-105.

The value of the glaucoma clinic is mainly that 95 percent of the people afflicted with glaucoma are kept under observation for two years or more, whereas previously 96 percent of them disappeared within two years. Analysis of the first 283 eyes with primary glaucoma observed over a period of two years shows that the better the visual acuity and the visual fields are at the time of the discovery of the disease the better is the chance of preservation of useful vision by continued observation and treatment. Of all the eyes with useful vision, only 14 percent became practically blind within two years. Loss of vision in the peripheral field usually precedes loss of central visual acuity. (4 tables, discussion.)

Gertrude S. Hausmann.

La Motte, W. O. **Primary glaucoma, its etiology, symptoms, and diagnosis.** Delaware State Med. Jour., 1943, v. 15, June, p. 101.

This paper presents a brief survey of glaucoma, intended for a nonophthalmologic medical group. Various reports of the incidence of blindness due to glaucoma range up to 20 percent. A classification of glaucoma is presented, primary glaucoma being divided into acute inflammatory, chronic inflammatory, and chronic simple types.

The early signs and symptoms of each of the three types are described, emphasizing differentiation from conjunctivitis and acute iritis. The early transient symptoms are described, along with cautious provocative tests for early cases. The importance of visual-field studies is brought out, and an illustrative case is cited.

Benjamin Milder.

Lloyd, R. I. **Glaucoma and the general practitioner.** New Orleans Med. and Surg. Jour., 1943, v. 96, Aug., p. 67.

The author summarizes the mechanism by which increased intraocular pressure impairs visual acuity and the field of vision. Briefly, in nontechnical language, the author outlines the signs and symptoms of glaucoma, the methods of diagnosis, and the responsibility

of the general practitioner in education of the public and control of glaucoma.

Benjamin Milder.

McLean, J. M. **What everyone should know about glaucoma.** Sight-Saving Review, 1943, v. 13, no. 2, p. 83.

In simple readable style the article tells the public of the importance of glaucoma, its symptoms, and its control. The author advises all who are middle-aged or older to find out if they have the condition.

Robert N. Shaffer.

Moreu, Angel. **The vascular factor in the treatment of glaucoma.** Arch. de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Sept., pp. 272-281.

This report is based on gonioscopic observation of one hundred cases of various types of primary glaucoma. In all hypertensive eyes an edema of the ciliary body and of the root of the iris was observed, manifested by a dark-bluish coloration and fine spots of exudation. This was interpreted to be an edema du to venous congestion rather than inflammatory edema. Successful operation or medical treatment caused disappearance of the edema but, if the tension was not completely normalized or if loss of vision and field continued despite normalization of tension, the edema persisted. All of the patients were stated to have either hypertension, arteriosclerosis, circulatory disturbance, or disequilibrium of the sympathetic-parasympathetic nervous system. Glaucoma was found to be in large part caused by a circulatory disturbance which was both local and general.

The classical medical and surgical treatment of glaucoma was employed with the addition of a vasodilator drug "Lacranol$_b$" This is a sodium nucleotide extr. ted from the muscles and blood of w.s-m-blooded animals. Taken by mouth it produces capillary dilatation without affecting appreciably the arterial pressure or intestinal musculature.

J. Wesley McKinney.

Torres, Estrada A. **Modifications of Heine's cyclodialysis.** Jour. Internat. College of Surg., 1943, v. 6, July-Aug., p. 378.

The modification consists in making the scleral opening only 4 to 5 mm. wide and placed at the 8 o'clock position in the right eye and at 4 o'clock in the left. A special spatula, set at an angle of 145° with the shaft, is introduced and the ciliary body is separated from the sclera for 180°. Both eyes are operated upon at a single session. The procedure is simple, involves no danger to sight, and is especially recommended in advanced glaucoma. The authors consider that cyclodialysis with ample separation is the only operation indicated for glaucoma. (2 figures.)

Eugene M. Blake.

9

CRYSTALLINE LENS

Bellows, J. G., and Nelson, D. **Anoxia cataract.** Proc. Soc. Exper. Biol. and Med., 1943, v. 54, Oct., p. 126.

Rats were placed in a steel chamber in which the pressure was gradually reduced to an equivalent of 30,000 feet or more altitude. Fifty percent of the rats died. Seventy-five percent of the dead animals and 10 percent of the survivors showed lens opacities. To prove that anoxia alone is the important factor in producing cataract and that pressure and asphyxia are unimportant, rats were placed in a glass

chamber through which a mixture of 5 percent oxygen and 95 percent nitrogen was constantly flowing, the rats developing cataract under these conditions.

Since lactic acid plays a great role in the oxidation process of the lens, the lactic-acid content of the aqueous at high altitudes was determined. The aqueous humor of one eye in each animal was removed. After two hours for recovery the animals were placed in a decompression chamber, some being kept for control. The lactic-acid content of the aqueous of the second eye was three to four times as high as that of the first eye or of the controls. The pH of the aqueous was found unaltered in high altitude.

After decompression the iris is hyperemic. In the superficial cortex diffuse gray opacities are visible. The anterior superficial suture becomes more readily visible. Similar although less marked changes are found in the posterior cortex. In severe cases the fiber structure is lost and a glistening white total cataract is formed. After an hour the cataract gradually regresses.

The authors examined the lenses of human volunteers subjected to decompression equivalent to 18,000 feet altitude, but no lens opacities were noted.

R. Grunfeld.

Berkove, A. B. **Asthenopia and amblyopia caused by congenital lens-vitreous changes.** The Military Surgeon, 1943, v. 93, Nov., p. 415.

The author describes a symptom complex characterized by defective vision and painful, light-sensitive eyes. Slitlamp studies reveal mutton-fat opacities scattered throughout the lens, sclerotic posterior Y, and coarse lamellar structure in the vitreous. The writer reports five cases as examples of 25 cases studied. It is suggested that the condition is frequent in cases of unexplained amblyopia.

Robert N. Shaffer.

Buschke, Wilhelm. **Classification of experimental cataracts in the rat.** Arch. of Ophth., 1943, v. 30, Dec., pp. 735-750.

Cataract formation has been observed in the rat under a number of different conditions. It has been found that feeding the rat a diet deficient in tryptophane produces either an acute or chronic form of cataract, whereas addition of tryptophane to the diet causes arrest in cataract formation. Microchemical studies show that there is never a complete loss of bound indole from the lens even in the advanced stages of tryptophane-deficiency cataract. Such cataracts are associated with inhibition of body growth and alterations in other epithelial structures, namely cornea, hair, and testicular epithelium. Attention is called to the fact that lens, hair, and testicle are all epithelial tissues that continue to grow throughout life. Cataracts resulting in rats from thallium poisoning and from riboflavine deficiency are also associated with similar changes in cornea, hair and testicular epithelium.

On the basis of morphology, development, and allied symptoms, a classification of experimental cataracts in rats includes three principal groups, the diabetic, the tetanic, and the dystrophic. The diabetic group includes cataract associated with experimental diabetes as well as galactose and xylose cataracts; the tetanic group includes cataracts occurring in the course of dietary and postoperative tetany; and the dystrophic group, the cataracts ac-

companying riboflavine deficiency, chronic thallium poisoning, and tryptophane deficiency. The article is illustrated by slitlamp drawings of the various types of lens changes. (11 figures, references.) John C. Long.

Buschke, Wilhelm. **Dystrophic cataracts and their relation to other "metabolic" cataracts.** Arch. of Ophth., 1943, v. 30, Dec., pp. 751-762.

The author divides both experimental and clinical "metabolic" cataracts into hyperglycemic, tetanic and dystrophic groups. The dystrophic group is discussed in some detail and is subdivided in the following classification: (A) Experimental conditions: 1, riboflavine deficiency; 2, experimental chronic thallium poisoning; 3, experimental tryptophane deficiency. (B) Clinical cataract syndromes with predominantly atrophic dermatoses: 1, Rothmund syndrome; 2, Werner syndrome. (C) Cataract syndrome, with dermatoses of the atopic dermatitis type: Andogsky syndrome. (D) Clinical cataract syndromes associated with other cutaneous conditions, including those associated with follicular keratosis, telangiectasis, or myxedema, or with anomalies of the hair. (E) Cataract associated with mongolism and with myotonic dystrophy.

Typically the dystrophic cataracts are associated with alterations in other structures of the body. Primary endocrine dysfunction does not effectively explain the occurrence of these cataracts. The author concludes that the lesions are probably due to primary metabolic disturbances in the affected tissues on a hereditary basis. (Bibliography.) John C. Long.

Butler, T. H. **Cataract extraction.** Brit. Jour. Ophth., 1943, v. 27, Nov., pp. 495-509.

The advantages of drawing as a means of training the fingers for cataract surgery are emphasized. Medical students should have to pass an examination in drawing.

The most important preparation of the patient is psychologic. He should come to operation free from fear and confident of a successful outcome of his operation. The simpler the physical preparation is, the better. The patient must be examined for foci of infection, especially the teeth. The lacrimal sacs should be irrigated a few days before the operation, not on the day before. A culture should be taken 48 hours prior to operation, for medico-legal reasons if for no other. The tears contain their own antiseptic, and washing with normal saline just before operation is the author's only local treatment.

The only general treatment is to have the bowels properly emptied. If a preliminary iridectomy is to be done, eserine must be used with the cocaine because it is difficult to perform a neat iridectomy on a dilated pupil. No preliminary narcotics are used.

The advantages of a preliminary iridectomy are these: It gives the surgeon an indication of how the patient will behave at extraction and the size of the lens can be estimated in the coloboma. The cataract section is much easier to make when there is no danger of wounding the iris. For the preliminary iridectomy, a keratome incision is used and an iris hook is substituted for forceps. The patient goes home on the fourth day if there is no infection.

Extraction is done a month after the preliminary iridectomy. The author uses a projection lamp to avoid reflections. A nurse holds one of the patient's hands centrally over the chest. Then the patient is not asked to look down, but to look at his hand.

For akinesia an injection of novocaine and adrenalin into both lids and into the temple is used half an hour before operation. No retrobulbar injection is used.

The section is made with a speculum in place. The speculum is removed after the section. Visible cortex is expressed with a lens spoon. No attempt is made to wash out cortex. If vitreous is lost, the eye is closed at once and is not opened for four days. If the iris is then impacted, it can be dealt with under a general anesthetic.

If capsulotomy of aftercataract is necessary it should be done within a month after operation if the eye is free from inflammation. At this time, the zonule is still maintaining some tension upon the capsule, and if a vertical incision is made the slit gapes and gives an oval aperture. The Ziegler knife should not be introduced through the clear cornea but through the limbus.

Alternative types of extraction are considered. Simple extraction with a round pupil is objectionable because of the amount of pressure on the globe which is necessary and the trauma to the iris. Extraction under a conjunctival bridge makes it difficult to deliver the lens and there is often an extreme degree of astigmatism. The author considers the intracapsular operation far more dangerous than any other type because of the heavy pressure he has found necessary to deliver the lens. He has performed very few such operations and will never do any more!

Edna M. Reynolds.

Gemeroy, J. C. **Intracapsular cataract extraction.** Michigan State Med. Soc. Jour., 1943, v. 42, Oct., p. 812.

The author describes a modification of Dimitry's suction syringe wherein it is possible to release the plunger—to create the vacuum at the instrument tip—while still holding the syringe near its base with thumb and fingers. Its application in 56 cases is reported. In six of these there had been failure to remove the lens by other intracapsular methods. Suction was applied at the upper anterior portion of the capsule and the lens slid out rather than tumbled. Thirty-five of fifty cases required iridectomy, while in 15 dilatation of the pupil was sufficient to allow retention of a round pupil.

The difficulties encountered with this method are illustrated by a case in which the zonule failed to rupture in a 17-year-old diabetic, rupture of the lens capsule after applying suction, in four cases of hypermature cataract, and one case of rupture of the capsule on introducing the tip. Prolapse of the iris occurred in two cases and retinal detachment in three of the 56 cases. Vitreous was lost in seven cases but not as a result of its being sucked into the syringe. This method does not supplant others but affords a help which may be valuable, as demonstrated in six of the author's complicated cases.

Owen C. Dickson.

Goldsmith, Jacob. **Original studies on the internal dynamics of the intracapsular cataract extraction.** New York State Jour. Med., 1943, v. 43, Sept. 15, pp. 1739-1750. (See Amer. Jour. Ophth., 1943, v. 26, June, p. 640.)

Howell, T. J. **A plea for the intracapsular extraction of cataract.** South African Med. Jour., 1943, v. 17, Sept. 11, p. 275.

Essential requisites for a successful intracapsular extraction in the hands of the author are briefly described. These include lid akinesia, a slowly administered retrobulbar injection, and

superior rectus and corneal sutures. A fairly large limbal section made the best start. Next came a small peripheral iridectomy or iridotomy in a pupil moderately dilated (not by atropine). After breaking the zonule and rotating the lens, with the latter fixed in the wound, the capsule forceps were released and reapplied, and the lens was delivered by lateral rotatory pulling movements. Eserine 0.5 percent and cocaine 2 percent in oil were instilled into the conjunctival sac.

Elimination of the possibility of glaucoma or delayed union from incarcerated capsule, avoidance of capsulotomy after the extraction, and the perfect cosmetic result obtained from a successful intracapsular extraction far outweigh the very limited disadvantages of the operation.

Francis M. Crage.

Kirby, D. B. **The development of a system of intracapsular cataract extraction.** Amer. Jour. Ophth., 1944, v. 27, Feb., pp. 124-136. (References.)

Knapp, Arnold. **Retinal detachment and trauma.** Arch. of Ophth., 1943, v. 30, Dec., pp. 770-774; also Trans. Amer. Ophth. Soc., 1943, v. 41. (See Section 10, Retina and vitreous.)

McDannald, C. E. **Neurodermatitis with cataract.** Arch. of Ophth., 1943, v. 30, Dec., pp. 767-769.

Two cases of neurodermatitis with cataract were observed in white patients, one a man of 18 and the other a woman of 23 years. Both patients were emotionally unstable and reacted positively to many different tests for allergy. The skin of the eyelids was brawny, red, and itchy in each case. In each patient, cataract appeared and matured rapidly during the active stage of eczema and neurodermatitis. Linear cataract-extractions were performed with good results on all four eyes involved. The woman failed to get normal vision because of a coexisting bilateral keratoconus. Apparently cataracts associated with neurodermatitis lend themselves well to surgical intervention. (References.) John C. Long.

Marback, H. **Sign of oil drop in pupil; microphakia; anterior lenticonus.** Arquivos Brasileiros de Oft., 1943, v. 6, Aug., pp. 119-124.

A man aged 23 years came to the clinic on account of poor vision which had existed since infancy. The pupils reacted well to light, and had an average diameter of 2 mm. The skiascopic examination indicated myopia of 30 diopters. Under atropine each eye showed a brilliant circle coinciding exactly with the equator of an abnormally small lens, the lens diameter appearing to be approximately 4 to 5 mm. There were two distinct pupillary zones, one inner, central, opalescent, the other peripheral but clear, the whole picture giving the appearance classically described as "oil drop in the pupil." Ophthalmoscopy showed in each eye two images of the ocular background, one central and direct, the other peripheral and inverse. The sudden interruption at the boundary between the two images made it impossible to follow the course of the retinal vessels.

Biomicroscopy indicated a spherical deformity of the anterior face of the lens, with anterior chamber very shallow, the anterior pole of the lens being hardly 2 mm. behind the cornea. The deformity appeared to exist at the expense of the anterior capsule and the anterior half of the senile nucleus, the fetal nucleus having a normal aspect. The zonula was visible in the whole

circumference, but there was a reduced number of suspensory fibers. The lens was not dislocated. (Illustrations, references.) W. H. Crisp.

Neblett, H. C. **Ulcer of the cornea at the site of the corneal-suture wound.** Southern Med. and Surg., 1943, v. 105, Oct., p. 452.

Cataract extraction was performed on two negro women, one aged 67 and the other 70 years. Each gave the history of having had multiple chalazion of the lids of each eye over a period of years. On the fifth and seventh day respectively after the operation the eyelids became indurated and an ulcer developed at the site of the suture wound. The ulcer was round and had no tendency to undermine. In one case recovery was had with fair vision; in the other, which was complicated by severe and protracted uveitis, light perception only was secured. The author concludes that corneoscleral sutures are contraindicated in any case presenting a history of a chronic inflammation of the lids, of the lacrimal apparatus, or of the globe.

R. Grunfeld.

Stone, L. S. **Factors controlling lens regeneration from the dorsal iris in the adult Triturus viridescens eye.** Proc. Soc. Exper. Biol. and Med., 1943, v. 54, Oct., p. 102.

Slight injuries to the fully developed lens in the adult salamander eye cause the lens to degenerate, and in such cases a new lens develops from the dorsal pupillary margin of the iris. If a piece of a dorsal iris from a normal eye is transplanted to a lensectomized host eye a new lens will develop from the graft. If, however, the host eye possesses a normal lens the latter strongly inhibits lens regeneration. Experiments proved, moreover, that the presence of a regenerating lens from an iris not older than 25 days in a lensectomized eye does not inhibit nor prevent the regeneration of a lens from other dorsal iris-tissue in its environment, and under some circumstances even three lenses may grow in the same eye. If the regenerating-lens is older than 25 days it inhibits lens regeneration from another iris tissue.

R. Grunfeld.

Torres Estrada, A. **Surgical procedure in the operation of cataract.** Jour. Internat. College of Surg., 1943, v. 6, July-Aug., p. 301.

Torres Estrada considers akinesia of the lids and wound sutures the most important details of technique. He employs two corneoscleral sutures, one at the ten o'clock and one at the two o'clock position, leaving a conjunctival bridge above. A small inverted-V-shaped cut in the conjunctiva at the 12 o'clock position permits performance of a peripheral iridectomy, the cut being afterward sutured. The lens is extracted with an erisiphake or with capsule forceps. (8 figures.)

Eugene M. Blake.

Wolfe, O. I., and Wolfe, R. M. **The Barraquer technique in incipient cataract and glaucoma.** Jour. Internat. Col. Surg., 1943, v. 6, July-Aug., p. 354.

The authors feel that intracapsular extraction is the procedure of choice in cataract occurring in or with incipient glaucoma. They prefer a modification of the Barraquer erisiphake technique with the addition of a punch sclerectomy. The incision is made with a keratome 1.5 mm. above the limbus, and is enlarged with scissors. Two corneoscleral sutures are placed before the section is made, and several con-

junctival sutures at the end of the operation. Details as to the amount of suction vacuum employed are given and stress is laid upon a careful general preoperative study of the patient. (6 figures.) Eugene M. Blake. Owen C. Dickson.

10

RETINA AND VITREOUS

Arruga, H. **Search for and localization of retinal tears.** Arch. de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Aug., pp. 173-180.

The importance of exact localization of tears before and during the operation for retinal detachment is emphasized. Not only must the tear be sealed but the less the amount of diathermy used the less will be the postoperative reaction and the greater will be the probability of success. With the modern technique, reattachment should be obtained in 70 to 80 percent of the cases operated upon. The various methods of localizing tears are reviewed.

J. Wesley McKinney.

Ballantyne, A. J. **Retinal hemorrhage.** Irish Jour. Med. Science, 1943, sixth series, Oct., p. 551.

A sudden rise of pressure in the venous circulation as it occurs in thrombosis, choked disc, or subarachnoidal hemorrhage will result in venous stasis with consequent hemorrhage in the retina. But the distribution of the hemorrhage will differ in the three conditions mentioned.

Although in thrombosis of the central retinal vein the hemorrhage may be sudden, it is nevertheless only the final phase of a progressive, gradually developing obstruction of the venous circulation. The walls of the veins covering a wide area have suffered for a long time from the consequent anoxemia, and the hemorrhage, therefore, will be widespread. In papilledema and subarachnoid hemorrhage, however, the retinal hemorrhage takes place near the disc, where the surrounding tissues give diminished support to the venous wall. Furthermore, the hemorrhages often form a sleeve or cuff on the veins as they leave the disc.

Capillary hemorrhage predominates when the hemorrhage is seen between the visible retinal vessels. If a blood vessel passes through such a hemorrhage it is accompanied by a blood-free zone, a pale band on either side of the blood column, corresponding to the capillary-free zone which lies on either side of the retinal arteries.

Of arterial origin are the striate and fan-shaped hemorrhages lying in the nerve-fiber layer where the first capillay plexus is situated. Of venous origin are the punctate or petechial hemorrhages which take their origin from the efferent venules forming the deepest capillary plexus in the outer molecular layer. From these the arterial aneurysms have to be differentiated. The latter are round, blood-red masses whose diameter is about that of a secondary retinal vein, and which have a glistening reflex at their center giving the impression that they are encapsulated.

Punctate hemorrhages do not show a surface reflex, and when they occur in the perimacular region they are pathognomonic of diabetus mellitus. In retinitis circinata the hemorrhage has a petechial character, while in disciform degeneration the preceding hemorrhage consists of an ill-defined splotch. R. Grunfeld.

Berkove, A. B. **Asthenopia and amblyopia caused by congenital lens-vitreous changes.** The Military Sur-

geon, 1943, v. 93, Nov., p. 415. (See Section 9, Crystalline lens.)

Cordes, F. C. **The use of vasodilators in acute fundus diseases.** Ophth. Ibero Amer., 1943, v. 4, no. 4, pp. 435-558 (in Portuguese); pp. 449-461 (in English). (See Amer. Jour. Ophth., 1943, v. 26, Sept., p. 916.)

Esteban, Mario. **So-called "black vision" and "red vision" of aviators.** Arch. de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Sept., pp. 251-268.

Studies of the effects of centrifugal force on the human body have been stimulated by the importance of aviation in modern warfare. In dive-bombing and the normal "loop" the head remains inside and the feet outside in relation to the curvilinear movement of the airplane. The displacement of the blood is directed away from the head to the abdomen and lower extremities, causing ischemia of the head. The retinal circulation is particularly susceptible to the exsanguinating effect of centrifugal force acting in the above manner, and gives the first danger signal before other symptoms develop. Forms and colors disappear. A black veil falls before the eyes, giving rise to the phenomenon of "black vision." Then, if the action of centrifugal force is more marked, total loss of consciousness occurs. The effect last only momentarily, as the pilot comes out of the turn with consequent lessening of the centrifugal force.

More dangerous than the above are the outside loops in which the feet and abdomen occupy the inside position and the head the outside. The blood and cerebrospinal fluid are displaced toward the head, with consequent increase in intracranial and intraocular pressure. The pilot experiences a fulness of the head which may suddenly become a headache, followed by a blackout. The loss of consciousness lasts only momentarily, but the headache often persists several hours. Often ecchymoses of the conjunctiva, eyelids, and cheeks are produced, and there is a real danger of cerebral hemorrhage. In the case of outside loops retinal circulation is protected by the increased intraocular pressure, and retinal hemorrhages are rare. J. Wesley McKinney.

Knapp, Arnold. **Retinal detachment and trauma.** Arch. of Ophth., 1943, v. 30, Dec., pp. 770-774; also Trans. Amer. Ophth. Soc., 1943, v. 41.

As it is not yet exactly known how a detachment of the retina is produced, the relation to trauma must remain vague. The author studied four hundred cases of detachment, obtaining in 52 a definite history of trauma. Traumatic origin of detachment is obvious in cases in which there has been a puncture wound or direct trauma to the eye. The cause of detachment where there has been indirect trauma is much more obscure. Detachment is often associated with injuries involving generalized jarring or lifting, or with coughing or sneezing. It is assumed that many detachments follow indirect injuries in eyes already predisposed to detachment. Among predisposing factors may be considered myopia, cystoid degeneration of the retina, degeneration due to local circulatory disturbances, and changes in the vitreous. Predisposition to detachment is evidenced by the fact that of the cases here reviewed, 14 percent showed bilateral involvement.

Detachment of the retina was observed in 37 cases of aphakia. Predisposition and loss of vitreous are thought to be factors in this complica-

tion. Detachment has been frequently observed after needling and either extracapsular or intracapsular extraction. Operation for congenital cataract seems to have an especially bad prognosis. This may be because of the greater length of life after the operation. In a series reported by Shapland, the detachment occurred at an average interval of 24.6 years after removal of congenital cataract. (References.)

John C. Long

Laval, Joseph. **Coats's disease.** Amer. Jour. Ophth., 1944, v. 27, Feb., pp. 163-167. (3 figures, references.)

Lijo Pavía, J. **The central artery of the retina. Provocative pulsation. Its analysis by photography.** (Part 1.) Rev. Oto-Neuro-Oft., 1942, v. 17, May-June, pp. 79-85. (See also paper by Lijo Pavía and Cerboni.)

The author uses an ophthalmodynamometer for making pressure on the eyeball to produce the arterial pulse, photographs of the fundus then being made for corroboration and study. As in a previous paper, he finds that the appearance, under pressure, of the arterial pulse represents the minimal arterial pressure. He gives due credit to Bailliart's observations.

In his own observations of three cases (his fundus photographs are well done in progressive frames), the dynamometer is used to gradually increase the pressure made upon the eyeball to the point of arterial collapse or contraction during diastole (known as the median pressure). He discovered that in hypertensive patients this phase of arterial contraction was more prolonged than in normal individuals, and he interpreted this as a latent state of angiospasm. Further reports on this subject are to follow.

Edward Saskin.

Lijo Pavía, J., and Cerboni, F. C. **The central vessels. Double retinal pulse. Photograph evidence.** (Part 1.) Rev. Oto-Neuro-Oft., 1942, v. 17, March-April, pp. 47-51.

The authors state that the spontaneous and evident retinal venous pulsation depends on the equilibrium established between the pressure of the retinal veins and the intraocular pressure, the former being dependent upon the power of the cardiac contractions. Evidence is offered to the effect that the venous pulse is present in only 37 percent of all individuals.

Applying an ophthalmodynamometer to the eye it is found that the venous pulse is a manifestation of the ventricular systole. Continued pressure on the eyeball causes disappearance of the venous pulse at the time of auricular systole, by reason of neutralization of the maximum intravenous pressure. Further compression of the eyeball now causes appearance of an arterial pulsation, indicating the minimal arterial pressure, and normally no visible venous pulse. However, in certain cases, the venous pulsation persists in spite of pressure on the eye with the dynamometer, the phenomenon known a "double retinal pulse." The authors feel that persistence of the venous pulse under pressure on the eye is due to poor return circulation which causes a rise in the venous pressure almost to the level of the arterial pressure. In a case of central retinal-vein closure here reported, the dynamometer revealed a double retinal pulse. The authors' findings are substantiated with a fundus photograph. Edward Saskin.

Lister, A., and Bishop, J. W. **Night vision in the Army.** Brit. Med. Jour., 1943, Sept. 11, p. 325. (See Section 3, Physiologic optics, refraction, and ocular vision.)

Loewenstein, A., and McGregor, I. S. **Senile and other pigmentary changes in the retinal ganglion cells.** Brit. Jour. Ophth., 1943, v. 27, Nov., pp. 486-495.

To determine whether the basis for staining of ganglion cells with scarlet red in hypertensive and diabetic retinopathy was just a senile change or was really pathologic, an investigation of fatty changes in the ganglion cells in normal eyes of different age-groups and in various diseased conditions was undertaken.

The ganglion cells of the middle-aged and aged show fatty droplets of lipoid staining in the plasma. In children, these changes are absent for the most part, but they do occur. The droplets may be so small as to be scarcely discernible, or so gross that the whole plasma may be full of them. The large ganglion cells of the periphery suffer predominantly. The smaller central ganglion cells are much less affected or not at all.

Apart from the brilliant droplet staining of the ganglion cells with scarlet red, the plasma of the ganglion cells of the periphery in senile retinae stained with scarlet red had frequently a brownish appearance, due to the presence of diffuse brown pigment, which may be a precursor of lipoid. Diseases such as hypertension, diabetes, and glaucoma cause pigmentary changes in the retinas of younger people similar to the changes seen in senile retinas. (11 illustrations, references.)

Edna M. Reynolds.

Rados, Andrew. **Fundus lesions in syphilis.** Jour. Med. Soc. New Jersey, 1943, v. 40, Aug., p. 304. (See Section 7, Uveal tract, sympathetic disease, and aqueous humor.)

12

VISUAL TRACTS AND CENTERS

Esteban, Mario. **So-called "black vision" and "red vision" of aviators.** Arch. de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Sept., pp. 251-268. (See Section 10, Retina and vitreous.)

Lyle, D. J. **Eye manifestations of head injuries.** Jour. Amer. Med. Assoc., 1943, v. 123, Dec. 4, p. 873. (See Section 16, Injuries.)

Moreu, Angel. **Considerations on the ophthalmologic diagnosis of hypophyseal tumors.** Arch. de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Aug., pp. 181-211.

An exhaustive article on the anatomic and clinical aspects of this subject. Six illustrative cases are reported briefly, with field charts.

Nuri Fehmi Ayberk. **About the importance of ocular symptoms in cerebral tumors.** Göz Klinigi, 1943, v. 1, Aug., p. 1.

The author underlines the great importance of the ophthalmologist in all questions concerning diagnosis and treatment of brain affections, especially brain tumors. The article is based mainly upon statements in the literature, not upon personal experience.

J. Igersheimer.

13

EYEBALL AND ORBIT

Dubourdieu, J., Canabal, E. J., and Gonzalez Vanrell, F. **Wallenberg's**

syndrome. Arch. Uruguayos de Med., Cir. y Especial., 1943, v. 22, June, pp. 544-552. (See Section 7, Uveal tract, sympathetic disease, and aqueous humor.)

Gifford, S. R. **Plastic shell for use in the simple evisceration of the globe.** Arch. of Ophth., 1943, v. 30, Dec., pp. 775-776.

The only disadvantage noted in simple evisceration of the globe by the method of Harold Gifford has been the occurrence of conjunctival chemosis. As the conjunctiva is not cut during this operation, a very considerable amount of fluid may accumulate under it. The author has devised a plastic shell which can be fitted over the evisceration stump so that constant and uniform pressure is applied. This not only prevents chemosis but by holding the cornea and sclera in correct position produces a better stump. Employment of the shell is also of advantage after enucleation with implant in Tenon's capsule. (One illustration.)

John C. Long.

Lloyd, R. I. **Embryological basis of extrapapillary coloboma and conus.** Trans., Amer. Acad. Ophth. and Otolaryng., 1942, 47th mtg., Sept.-Oct., pp. 7-16.

There are two types of developmental error of the human eye connected with the pigment layer, the lamina vitrea, and the choriocapillaris. These are extrapapillary coloboma, and the defects located in and about the optic nerve and known as conus, coloboma, or ectasia. Extrapapillary coloboma is named to distinguish it from defects due to defective closure of the optic fissure. These characteristic lesions are located in and about the posterior pole, are multiple or single, of variable size and unilateral or bilateral. Histologic examination of the affected area shows only the inner retinal layer in the affected areas. The pigment layer is missing and the choroid consists only of a few shreds of pigmented tissue. The sclera may be reduced to a thin layer which may bulge, producing the change in level seen in the more serious defects. Important is the differential diagnosis of these lesions from chorioretinal tuberculosis, hereditary macular degeneration, and the results of trauma with hemorrhage. (14 illustrations.)

Gertrude S. Hausmann.

Pérez Llorca, J. **A case of cryptophthalmia.** Arch de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Sept., pp. 269-271.

The condition is defined as a neoformation wherein the skin passes in front of the eye to the face without solution of continuity, that is, without a trace of palpebral fissure. A case is reported with the pathologic findings.

J. Wesley McKinney.

Smelser, G. K. **Water and fat content of orbital tissues of guinea pigs with experimental exophthalmos produced by extracts of the anterior pituitary gland.** Amer. Jour. of Physiology, 1943, v. 140, Dec., pp. 308-315.

The author's experiments on animals show that when an extract of anterior pituitary gland is injected into thyrectomized guinea pigs these become affected by exophthalmos with hypertrophy of the retrobulbar fat and extraocular muscles. This effect is due mostly to increase in the amount of interstitial water in these tissues but in part to increase of connective tissue in the orbital fat. The extract used was prepared from the anterior lobe of beef pituitary gland, and 15 to 20 mg. was

injected subcutaneously daily for 60 to 70 days. The animals had been thyrectomized 10 to 20 days prior to the first injection. The methods of the experiments are given in detail and the results on orbital and nonorbital tissues are shown in tabulation form. Table 1 shows a comparison of water and lipid content of the orbital tissues of control and exophthalmic guinea-pigs, and table 2 a comparison of water content of nonorbital tissues of control and exophthalmic guinea-pigs. A discussion on the result closes the article, with the statement that the cause of the increase in water content is the same in both fat and muscle and that an increased vascular permeability may possibly be the factor immediately responsible for this change. The finding that the water content of nonorbital tissues is also increased may be correlated with clinical observations of localized edema in nonorbital tissues of persons with exophthalmos.

Melchiore Lombardo.

Stone, L. S. **Return of vision in transplanted adult salamander eyes after several days of refrigeration.** Proc. Soc. Exper. Biol. and Med., 1943, v. 54, Oct., p. 44.

Fifty-nine adult triturus viridescens eyes were refrigerated in sterile Ringer's solution at temperatures varying from 0 to 8 degrees centigrade, and for periods varying from 2 to 14 days and were then transplanted into freshly denuded orbits of new hosts. The best results were achieved when the eyes were preserved at between 4 and 6 degrees centigrade and for not longer than three days, the eyes in some cases recovering vision at the end of three months. If the eyes were kept on refrigeration for a longer period than three days or the temperature was higher or lower than the optimum given above, the results were correspondingly poorer. R. Grunfeld.

14

EYELIDS AND LACRIMAL APPARATUS

Belmonte Gonzáles, Nicolas.. **Toti operation without sectioning the internal palpebral ligament.** Arch. de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Aug., pp. 167-172.

The operation differs from the original in that the incision begins at the level of the internal palpebral ligament and extends rather farther downward, and the ligament is not cut. Although this modification makes the operation somewhat more difficult, the canaliculi are more surely left intact and the muscular action of the orbicularis, which propels the tears into the sac, is preserved. J. Wesley McKinney.

Sugar, H. S. **Tarsoconjunctival sliding-graft techniques for eyelid reconstruction.** Amer. Jour. Ophth., 1944, v. 27, Feb., pp. 109-123. (13 figures, references.)

Thygeson, Phillips. **Staphylococcic blepharitis.** Trans. Amer. Acad. Ophth. and Otolaryng., 1942, 46th mtg., July-Aug., pp. 265-272.

In a series of 249 cases, pathogenic staphylococci were found to be an important primary cause of marginal blepharitis. Increased activity of the sebaceous glands of the lids or the meibomian glands seemed also to be a very important causative agent. Staphylococcic blepharoconjunctivitis is characterized by extreme chronicity and by resistance to treatment of corneal complications and internal and external hordeola. Specific antistaphylococcic therapy consisting of staphylococcus toxoid, and local application

of sulfathiazole in ointment form, proved more effective than other methods in producing permanent healing. In only a small percentage of cases was rapid healing obtained, most cases requiring prolonged treatment. Important supplemental treatment included expression of secretion from meibomian glands and epilation of infected cilia. Gertrude S. Hausmann.

15
TUMORS

McBean,. G. M. **Bilateral metastatic carcinoma of choroid.** Arch. of Ophth., 1943, v. 30, Dec., p. 776.

A woman aged 52 years had had both breasts amputated for carcinoma. There was recurrence about the right clavicle. The right eye developed an area of episcleritis temporally and a pale gray zone was observed in the fundus under the insertion of the lateral rectus muscle. Glaucoma appeared and failed to respond to an iridectomy. The eye was removed and on microscopic examination was found to have a metastatic carcinoma under the insertion of the external rectus muscle. Numerous other metatases developed, and the left eye became blind from a wide retinal detachment which covered a solid growth. Although post-mortem examination of the eye was not permitted, it was assumed that the left eye was also the site of a metastatic growth.

John C. Long.

16
INJURIES

Arruga, H. **Radiographic localization of ocular foreign bodies.** Arch. de la Soc. Oft. Hisp.-Amer., 1942, v. 1, Sept., pp. 282-285.

The author reviews the known methods of localization of intraocular foreign bodies and proposes a simple and effective method of his own. The procedure consists in inserting small suture needles with attached threads into the episcleral tissue in the approximate region of the foreign body as indicated by the wound of entrance and by posterior-anterior and lateral X rays. When the needles have been inserted the X rays are repeated, giving an exact localization in relation to the needles.

J. Wesley McKinney.

Carlisle, J. M. **Medical first aid in eye accidents and injuries.** Sight-Saving Review, 1943, v. 13, no. 2, p. 75.

The author summarizes methods of first-aid treatment. He points out that usually only a physician should do more than the most superficial of treating. Various neutralizers for chemical burns are listed, together with suggestions as to follow-up care, stressing the late dangers from alkali burns, and care needed to avoid symblepharon in any of them.

Methods of handling superficial foreign bodies are given. It is suggested that all cases of penetrating foreign body and all but the most superficial corneal abrasions be sent immediately to an eye specialist. Proper early treatment can minimize or prevent permanent disabilities. All but the most trivial cases should be promptly referred to an ophthalmologist.

Robert N. Shaffer.

Cogan, D. G., Kinsey, V. E., and Drinker, P. **Infrared therapy of flash keratoconjunctivitis.** Jour. Amer. Med. Assoc., 1943, v. 123. Dec. 4, p. 883.

Infrared therapy was of no benefit in keratoconjunctivitis produced in rabbits by exposure to a mercury-vapor arc. George H. Stine.

Culler, A. M. **War injuries of the eye.** United States Naval Med. Bull., 1943, v. 41, Nov., pp. 1557-1564.

The author reviews 118 cases treated in a Naval Base Hospital in the South Pacific. He emphasizes the similarity of the problems that confront the ophthalmologist in civilian and military practice. Although errors of refraction and ocular diseases such as iritis and corneal ulcer seem relatively minor conditions, they are responsible for incapacitation in 9/10 of the cases here reported. The most frequent war injuries are shrapnel wounds, which are usually binocular and multiple. Careful removal of the foreign bodies, sulfa drugs by mouth, atropine, 5-percent sulfathiazole ointment, and continued cold applications constitute the treatment recommended. The ocular injuries resulting from air raids include burns, blast injuries, and direct trauma. Burns are especially frequent in this war, because of the use of incendiary bombs. Immobilization of the lids by sutures and early skin grafts are recommended. Damage to the eyeball is frequent in all head injuries, especially those involving the cranial cavity. Choroidal tears and their frequent sequel, proliferative traumatic chorioretinitis, especially involving the papillomacular region, are often encountered. Mental stress and shock form an important ophthalmic element in battle casualties. Charles A. Bahn.

Kemal, Tarkan. **A case of encapsulation of a foreign body beneath the bulbar conjunctiva.** Göz Klinigi, 1943, v. 1, Aug., p. 10.

The right eye was injured by a small fragment of a bullet 25 years ago. Inflammation lasted three months. When the eye could be opened again, the foreign body was visible beneath the conjunctiva near the caruncle. The foreign body remains in the same position. It had done no damage to the eye.

J. Igersheimer.

Knapp, Arnold. **Retinal detachment and trauma.** Arch. of Ophth., 1943, v. 30, Dec., pp. 770-774; also Trans. Amer. Ophth. Soc., 1943, v. 41.

Lyle, D. J. **Eye manifestations of head injuries.** Jour. Amer. Med. Assoc., 1943, v. 123, Dec. 4, p. 873.

The author divides the traumas due to head injury into the main divisions of cerebral concussion, contusion, compression and laceration, hemorrhage, and skull fractures. The ophthalmologic manifestations are either sensory or motor disturbances. There may be oculomotor palsies, intraocular or extraocular, with fundus changes in a certain percentage of cases. The importance of the pupillary changes during the early and late stages, especially noted among the compressions, hemorrhages, and skull fractures, is stressed. The important pupillary reflexes which are variable during the course of the condition should not be masked by a cycloplegic, a weak, fleeting mydriatic being the choice for fundus examination. Fundus changes include arteriolar spasms with ischemia, venous congestion, edema of the disc, and choking in the more severe cases. Visual-field changes may remain as the result of irreparable damage to the visual system. (4 cases, 12 figures, discussion.)

George H. Stine.

Malabehar Peña, Carlos. **Does fluorescent light cause injury to the eyes?** Bol. del Hosp. Oft. de Ntra. Sra. de la Luz, 1942, v. 2, Jan.-April, pp. 21-23.

On the basis of figures furnished by the manufacturers, the author emphasizes the relative absence of heat rays in the light of the fluorescent lamp and the quantitative approximation of ultraviolet rays to those of daylight. He concludes that this type of lighting is

not prejudicial or dangerous for the human eye. W. H. Crisp.

Rocco, Alfredo. **Intraocular foreign body.** Arquivos Brasileiros de Oft., 1943, v. 6, Aug., pp. 127-131.

The patient's left eye was struck by a foreign body which seemed to originate in whirling movements imparted to a tape measure in the hands of a passer-by. A wound found in the region of the upper limbus was closed with two sutures. The vision was soon completely abolished. When the patient came for examination by the author the eye, which was completely blind, showed conjunctival chemosis, and a steady discharge from the wound. On account of the evident panophthalmitis, the eyeball was enucleated. Section of the enucleated globe showed in the vitreous a very large metallic object corresponding in shape to the protective cap commonly attached to the extremity of a tape measure. The foreign body measured 2 cm. in its long diameter. The author emphasizes the desirability of an X-ray examination in any such case. (References, 1 illustration.) W. H. Crisp.

Stewart, D. D. S., and Lloyd, J. P. F. **Transient slitlamp appearances due to concussion by small particles.** Brit. Jour. Ophth., 1943, v. 27, Nov., pp. 483-485.

The slitlamp showed the appearance of small gray plaques in the form of wreaths about 2 mm. in diameter, at the level of Descemet's membrane and the endothelium, in an eye injured by "back-fire" from the breech of a rifle. The wreaths did not intersect and were not contangential in any instance. The plaques were visible 30 hours after injury but had disappeared 15 hours later. Superficial foreign bodies were removed and the eye was entirely quiet a week after the injury, the visual acuity being 6/6 with correction. It is suggested that the gray flecks which constituted the wreaths were optical effects from local variation in the index of refraction. (2 illustrations.)

Edna M. Reynolds.

Stieren, Edward. **Intraocular foreign bodies.** Jour. Amer. Med. Assoc., 1943, v. 123, Dec. 4, p. 880.

The author stresses the importance of a careful history, the immediate use of tetanus antitoxin, and location of the foreign body by ophthalmoscope and X ray. He advises immediate enucleation of an eye if the wound of entrance involves the ciliary body. He has discarded the use of the giant magnet in favor of the hand magnet, and deplores the use of the magnet as a diagnostic instrument. The posterior route is preferred wherever possible; detachment of the retina is not to be feared if the scleral incision is cauterized by the application of phenol or diathermic micropunctures. Some retained nonmagnetic foreign bodies, such as glass, may be well tolerated for years. Nonmagnetic metallic foreign bodies are dangerous and difficult to remove, phthisis bulbi resulting from loss of more than one fourth of the vitreous bulk or from extensive disturbance by instrumental manipulation. (Discussion.)

George H. Stine.

Tibbles, Sidney. **Burn of cornea from molten wax.** Brit. Med. Jour., 1943, Oct., p. 547.

A patient complained of loss of sight after some wax flew between the eyelids while flicking out a lighted wax taper. The cornea appeared normal, but on examination through the loupe a

perfectly transparent layer of wax was seen covering two-thirds of the cornea as if a contact glass was lying on it. The cornea did not stain with fluorescein until after the wax was removed, whereupon most of the vision was restored. The erosion was superficial, only the epithelium being affected. It is reasonable to assume that a fine layer of vapor protected the cornea.

R. Grunfeld.

17

SYSTEMIC DISEASES AND PARASITES

Carrasco y de Mier, M. **Ocular disturbances of dental origin.** Jour. Internat. College of Surg., 1943, v. 6, July-Aug., p. 322.

Carrasco y de Mier advises correction of all dental disease before operations involving the opening of the globe. Ocular infections may take place (1) by direct continuity, (2) indirectly through sinus disease, (3) by the vascular route, especially venous channels, or (4) as the effect of substances producing allergy. To date there is no proof of the transmission of infection through the lymphatics, but reflex nervous affections are common, and may result in ocular vasomotor and secretory changes. Eugene M. Blake.

Parsons, J. H. **Eye diseases in elderly patients.** The Practitioner, 1943, v. 150, June, p. 329.

This paper presents a brief survey of ocular conditions encountered in senile patients, including refractive changes, arcus senilis, miosis, incipient cataract (with controlled use of mydriatics for central opacities), and glaucoma. Of the vascular disturbances the author mentions thrombosis of the central vessels, and arteriosclerotic retinal changes. Benjamin Milder.

Spies, T. D. **The natural occurrence of riboflavin deficiency in the eyes of dogs.** Science, 1943, Oct. 22, p. 367.

In families showing deficiency diseases the household pets were often found to be emaciated and weak. Subsisting on table scraps mainly, such animals were suspected of having nutritional deficiencies. It was not uncommon to find black tongue in dogs. Recently eye symptoms similar to the ocular lesions of riboflavin deficiency in human beings were observed in dogs.

Four dogs from the homes of families suffering from deficiency were studied. Most marked was photophobia. Pronounced injection of the scleral and palpebral conjunctiva was present. The vessels were tortuous and unusually dilated. Slight rotary nystagmus was present. Along with these symptoms were those of pronounced black tongue. Slitlamp examination could not be made. Treatment with nicotinic acid and riboflavin promptly and completely relieved these animals. This suggested the presence of a mixed deficiency disease. Francis M. Crage.

Woods, A. C. **The influence of sensitivity and immunity on ocular tuberculosis.** Pennsylvania Med. Jour., 1943, v. 46, Aug., p. 1133.

The material of this article was covered in detail in the series published in the Archives of Ophthalmology from 1938 to 1942.

Desensitization of rabbits with tuberculoprotein markedly shortens and diminishes the severity of ocular tuberculosis. Thirty percent of a group of immune-allergic rabbits desensitized by frequent doses of tuberculin failed to develop ocular tuberculosis following the introduction of living tubercle bacilli. Five percent of the group in

which desensitization was stopped at the time of ocular inoculation failed to develop tuberculosis. Two percent of a control group of immune-allergic rabbits not desensitized failed to develop ocular tuberculosis. Incubation times for the reacting rabbits were 7, 4, and 2 weeks respectively.

Since, clinically, secondary ocular tuberculosis is frequently present in immune allergic states, the effect of a desensitization procedure after the establishment of a definite ocular tuberculosis was examined. Desensitization of rabbits which had a healed systemic tuberculosis was begun 17 days after inoculation of the eyes with tubercle bacilli. A marked focal reaction occurred in all the animals at the start of tuberculin therapy. The activity of the ocular process however gradually dropped in this group till at the end of the 22nd week only one was active in the treated group, while 12 were active in the control group (43 eyes each). At the end of five weeks only four of the treated group showed ocular tuberculosis, while 25 of the control group were active.

In rabbits, repeated intracutaneous injection of tuberculin controls ocular sensitivity and exerts a favorable effect on tuberculous infection already present or subsequently produced.

Owen C. Dickson.

18

HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Case, P. H. **Recent advances in ophthalmology of interest to the general practitioner.** Southwestern Med., 1943, Sept., p. 213.

In discussing ocular chemotherapy the sulfonamides receive the entire attention of the author. The surgical advances include corneal sutures and intracapsular extraction. Sodium-pentothal general anesthesia has helped in the highly nervous and in so-called "bad actors."

Advances in the treatment of squint, aniseikonia, avitaminosis, and color blindness are discussed. Orthoptics seems to be of proved value and is being more generally accepted. Preventive measures are being increasingly employed in industrial ophthalmology.

Francis M. Crage.

NEWS ITEMS

Edited by Dr. Donald J. Lyle
904 Carew Tower, Cincinnati 2

News items should reach the editor by the twelfth of the month

Deaths

Dr. Lee Cohen, Baltimore, Maryland, died December 31, 1943, aged 69 years.

Dr. Gordon H. Bahlman, Flint, Michigan, died December 22, 1943, aged 56 years.

Dr. Robert B. Dibble, Pueblo, Colorado, died December 29, 1943, aged 69 years.

Dr. William S. Wentzel, Sunbury, Pennsylvania, died December 1, 1943, aged 54 years.

Dr. John A. Fell, Doylestown, Pennsylvania, died January 4, 1944, aged 93 years.

Dr. Anders E. Johnson, Watertown, Pennsylvania, died December 30, 1943, aged 72 years.

Dr. William B. Beaumont, Laceyville, Pennsylvania, died December 22, 1943, aged 78 years.

Dr. Jesse F. Gamble, Lincolnton, North Carolina, died December 24, 1943, aged 65 years.

Dr. William W. Pearson, Des Moines, Iowa, died February 11, 1944, aged 74 years.

Dr. Jonas Clark, Gilroy, California, died December 30, 1943, aged 90 years.

Dr. John W. Conklin, Leitchfield, Kentucky, died November 10, 1943, aged 85 years.

Dr. William H. Oatway, Sr., Waukesha, Wisconsin, died January 2, 1944, aged 73 years.

Dr. Charles C. Rankin, Philadelphia, Pennsylvania, died recently, aged 71 years.

Dr. Michel M. Saliba, Wilson, North Carolina, died January 5, 1944, aged 68 years.

Dr. Joseph W. Straight, Santa Ana, California, died December 25, 1943, aged 75 years.

Dr. John W. Millette, Dayton, Ohio, died December 28, 1943, aged 79 years.

Dr. Edwin M. Rodenberger, Macedon, New York, died December 19, 1943, aged 83 years.

Dr. Frederick Parks Steck, Shamokin, Pennsylvania, died December 23, 1943, aged 75 years.

Dr. Harry H. Ainsworth, Birchwood, Wisconsin, died January 8, 1944, aged 71 years.

Dr. Alexander C. Blair, Pittsburgh, Pennsylvania, died January 4, 1944, aged 74 years.

Dr. John P. Williams, Lincoln, Nebraska, died December 13, 1943, aged 70 years.

Dr. Carl F. Schaub, Chicago, Illinois, died January 7, 1944, aged 41 years.

Dr. Major H. Worthington, Chicago, Illinois, died February 27, 1944, aged 64 years.

Dr. James Munsie, Cleveland Heights, Ohio, died January 18, 1944, aged 76 years.

Dr. Thomas E. Presley, Clovis, New Mexico, died January 6, 1944, aged 73 years.

Dr. Carl Koller, New York, New York, died March 21, 1944, aged 86 years.

Societies

The Reading Eye, Ear. Nose, and Throat Society, Reading, Pennsylvania, held a joint meeting with the Philadelphia Laryngological Society, January 19, 1944, in Philadelphia. Included in the program was a paper by Dr. James E. Landis of Reading on "Why we should organize a Pennsylvania Academy of Ophthalmology and Otolaryngology."

The Brooklyn Ophthalmological Society held its regular meeting February 17, 1944. The guest speaker was Dr. Donald J. Lyle of Cincinnati who presented a paper on "Diagnosis of visual losses with normal fundi." The discussers included Dr. Abraham M. Rabiner, Dr. E. Jefferson Browder, and Dr. Ralph I. Lloyd.

At the meeting of the Cleveland Ophthalmological Club on February 15th, Dr. William Thornwall Davis spoke on the "Diagnosis and treatment of accommodative squint."

The Washington, D.C., Ophthalmological Society held its meeting on March 6th at the District of Columbia Medical Society Building. The guest speaker was Dr. Ramón Castroviejo of New York City who discussed "Keratectomies and conjunctival plastics." A report on "A case of Coats's disease" was made by Dr. H. C. McKnew. Also included in the program were the following case presentations: "Circinate retinitis" by Dr. Bernard J. Gurwin; "Laceration of the globe" by Dr. Thomas R. Rees; "A case of plastic prosthesis" by Dr. Ernest Sheppard; and "Neurofibroma of the eyelid" by Dr. Inez E. Wilber.

On January 26, 1944, the Reading Eye, Ear, Nose, and Throat Society had as its guest speaker, Dr. Henry S. Ruth of Merion, Pennsylvania, president of the American Board of Anesthesiology, who spoke on the developments of the various Specialty Boards as well as the future in anesthesiology. This meeting was attended by all diplomates of Specialty Boards residing in Berks County.

Among the speakers at the symposium sponsored by the industrial health committee of the Utah State Medical Association on January 19th was Major John E. L. Keyes (MC), A.U.S. The subject of his paper was "Ophthalmology in industry."

Dr. William Thornwall Davis gave a paper on "Differential diagnosis of paresis of the right superior oblique or left superior rectus"

before the New York Academy of Medicine on February 21, 1944, in New York City.

The annual postgraduate industrial, medical, and surgical conference of the Michigan State Medical Society will be held on April 6th at the Horace A. Rackham Educational Memorial in Detroit. Dr. Melvin H. Pike of Midland will speak on "Eye pathology due to exposure to organic solvents."

There will be a meeting of the Association for Research in Ophthalmology, Inc., in June of this year. The meeting will be held at the Sherman Hotel in Chicago just prior to the meeting of the American Medical Association; namely, on June 13, 1944.

Any member wishing to present a paper or contribute to the program is requested to communicate with Major Brittain F. Payne, The School of Aviation Medicine, Randolph Field, Texas.

An interesting meeting with a varied program is anticipated, and all members who are able to attend are urged to do so.

Personals

Among those on whom a full professorship was conferred by the Emory University School of Medicine, Atlanta, Georgia, was Dr. Grady E. Clay, professor of ophthalmology.

Copies of Bielschowsky's "Lectures on motor anomalies," second edition, can be obtained from the Dartmouth College Publications, at Hanover, New Hampshire, price $1.50, postpaid.